東京帝國大學理學部紀要

第二類 地質學 鑛物學 地理學 地震學

第四冊 第一篇

JOURNAL

OF THE

FACULTY OF SCIENCE

IMPERIAL UNIVERSITY OF TOKYO

SECTION II

GEOLOGY, MINERALOGY, GEOGRAPHY, SEISMOLOGY

Vol. IV Part 1

TOKYO

Published by the University

June 15, 1935

The "JOURNAL OF THE FACULTY OF SCIENCE" is the continuation of the "JOURNAL OF THE COLLEGE OF SCIENCE" published by the University in forty-five volumes (1887–1925), and is issued in five sections:

Section I.—Mathematics, Astronomy, Physics, Chemistry
Section II.—Geology, Mineralogy, Geography, Seismology
Section III.—Botany
Section IV.—Zoology
Section V.—Anthropology

Committee on Publication

All communications relating to this JOURNAL should be addressed to the DEAN OF THE FACULTY OF SCIENCE, IMPERIAL UNIVERSITY OF TOKYO.

Pliocene and Pleistocene Bryozoa from the Bôsô Peninsula. (I)

1. Bryozoa of the Dizôdô Beds.

(With 10 text-figures and 7 plates)

By

Katuhiko SAKAKURA.

Received Oct. 3, 1934.

That the strata in the Bôsô Peninsula yield abundant fossil molluscs has been known for quite a long time. These fossils have already been fully described by Dr. Yokoyama, who gave their ages as Neogene and Pleistocene. With the molluscs are also found fossils of Brachiopoda, Echinodermata, Bryozoa, Madreporaria, Foraminifera, etc., but of these no published account of the Bryozoa is yet available.

This paper describes these Bryozoa, collected mostly in the course of a stratigraphical and palaeontological study of the central part of the Peninsula recently made by me together with Messrs. Y. Suzuki and S. Inagaki.[1] These studies were made under the guidance of Dr. S. Tokunaga, to whom my thanks are due for his many valuable advices and suggestions. I wish also to express my sincere thanks to Dr. Y. Okada, Zoological Institute, Tokyo University of Literature and Science, and to Dr. N. Yatu, Zoological Institute, Tokyo Imperial University, for their courtesy in placing their valuable libraries at my disposal.

1) As to the stratigraphy of the district, I intend to publish a paper on it in the Journal of the Geological Society of Japan in the near future.

1. Bryozoa of the Dizôdô Beds.[1]

Geological age.....Early Pleistocene.

Rock facies.....Light brown tuffaceous sands of medium grains, not stratified.

Fauna.....These Beds which are one of the most fossiliferous in the Bôsô Peninsula, contain, besides Bryozoa, abundant molluscs, brachiopods, solitary corals, echinoids, etc., all well preserved. The common and characteristic fossils are as follows:

Lamellibranchiata.

Cardium (*Nemocardium*) *modestum* AD. & RVE.
Chlamys (*Aequipecten*) *vesiculosus* (DKR.)
Chione mindanensis SMITH.
Glycymeris pilsbryi (YOK.)
G. rotunda (DKR.)
Pecten laqueatus (SOW.)
P. (*Patinopecten*) *tokyoensis* TOK.
Spisula (*Oxyperas*) *bernaldi* PILS.
Venericardia ferruginosa (AD.)

Scaphopoda.

Dentalium (*Antalis*) *weinkauffi* DKR.
D. (*Fustiaria*) *nipponicum* YOK.

Gastropoda.

Ancilla albocallosa hinomotoensis YOK.
Bursa (*Bufonaria*) *ramelloides* (RVE.)
Conus kiiensis KURODA MS.
C. tuberculatus YOK.
Homalopoma amussitata (SCHRENCK).
Natica (*Tectonatica*) *janthostoma* DESH.
Olivella signata japonica PILSBRY.
Siphonalia fusoides (RVE.)
S. spadicea (RVE.)

1) 地藏堂層

Brachiopoda

Laqueus rubellus (Sow.)
Pictothyris picta Thomson.
Terebratalia coreanica (Ad. & Rve.)

Zoantharia

Endopachys japonicum Yabe & Eguchi.
Flabellum transversale Moseley.
Heterocyathus aequicostatus elberti Felix.
H. a. parasiticus Semper.

Roughly speaking, this fauna consists of the Kurosio type-species and is akin to those living off the Kii Peninsula to-day, from which it may be inferred that the Dizôdô Beds were laid down in warmer seas than that now encircling the Bôsô Peninsula.

Localities·····Dizôdô I, Dizôdô II, and Dizôdô III. [Dizôdô, Makuta-mura, Kimitu-gun, Tiba-ken][1]
Atebi [Atebi, Makuta-mura][2]
Itinosawa [North of Itinosawa, Obitu-mura, Kimitu-gun][3]

Although the fossiliferous strata, stratigraphycally, seem to differ slightly according to locality, the fauna contained in them are indistinguishable from one another.

All the bryozoan specimens mentioned in this paper were collected by myself. They represent 55 genera and 77 species or subspecies, of which 52 are identical with or closely resemble known species, 2 are undetermined, while 23 seem to be new to science.[4]

LIST OF BRYOZOA FROM THE DIZÔDÔ BEDS.

(v. c = very common; c = common; r = rare; vr = very rare)

		Page	Dizôdô I.	Dizôdô II.	Dizôdô III.	Atebi	Itinosawa
	CHEILOSTOMATA						
1	*Aetea truncata* (Landsborough).	6	c	r	r	vr	—
2	*Cupuladria elongata* sp. nov.	6	—	vr	—	—	r
3	*Pyrulella corbula* (Hincks).	7	r	vr	vr	—	—

1) 千葉縣 君津郡 馬來田村 地藏堂
2) 〃 〃 〃 當 日
3) 〃 〃 小櫃村 市ノ澤
4) The characteristics of this bryozoan fauna will be discussed in the future paper.

		Page	Dizðdð I.	Dizðdð II.	Dizðdð III.	Atebi	Itinosawa
4	*Ellisina curvirostris* (Hincks).	7	r	r	—	r	—
5	*Tegella robertsoni* O'Don. & O'Don.	8	vr	—	—	vr	—
6	*'Tegella' kadusensis* sp. nov.	8	vr	—	—	—	—
7	*Amphiblestrum canui* sp. nov.	9	c	vr	r	vr	—
8	*Rhamphonotus okadai* sp. nov.	9	c	r	—	—	—
9	*Onychocella subsymmetrica* Canu & Bassler.	10	vc	c	c	c	vr
10	*Micropora coriacea* (Esper).	11	vc	r	r	r	—
11	*Rosseliana sibatai* sp. nov.	11	vc	vr	c	—	—
12	*Verminaria areolae* sp. nov.	12	c	r	vr	vr	—
13	*Labioporella elegans* sp. nov.	13	vr	—	vr	—	—
14	*Thalamoporella lioticha* (Ortmann).	14	vr	r	—	—	—
15	*Thalamoporella dizodoensis* sp. nov.	14	c	vr	r	vr	—
16	*Monoporella fimbriata* Canu & Bassler.	15	vc	c	r	r	—
17	*Cellaria triangularis* Ortmann.	15	vc	—	c	c	vr
18	*Caberea lata* Busk.	16	c	—	—	—	c
19	*Puellina radiata* (Moll).	16	c	—	—	—	—
20	*Figularia* cfr. *biporosa* (Okada).	17	—	—	—	vr	—
21	*Membraniporella subpetasus* sp. nov.	17	r	—	—	—	—
22	*Hippothoa divaricata* Lamouroux.	18	vr	—	—	—	—
23	*Hippothoa flagellum* Manzoni.	18	c	—	r	—	—
24	*Chorizopora brongniarti* Audouin.	18	vr	—	—	—	—
25	*Petraliella* cfr. *philippinensis* Canu & Bassler.	19	vr	—	—	—	—
26	*Schizoporella costulata* var. *distincta* nov.	19	c	—	r	r	r
27	*Arthropoma cecilii* (Audouin).	20	vr	—	—	—	—
28	*Schizopodrella ternata* (Ortmann).	20	r	r	—	—	—
29	*Schizopodrella spathulata* sp. nov.	20	c	—	r	—	vr
30	*Gemellipora minutipora* Canu & Bassler.	21	vr	—	—	—	vr
31	*Stephanosella biaperta* (Michelin).	21	c	r	vr	r	—
32	*Lacerna signata* (Waters).	22	c	r	vr	—	—
33	*Lacerna granulosa* sp. nov.	22	c	r	—	—	—
34	*Hippoporina porcellana* (Busk).	23	c	r	r	vr	—
35	*Hippodiplosia pertusa* (Esper.)	23	vr	—	vr	vr	—
36	*Exochella longirostris* var. *quadricella* nov.	24	c	r	—	vr	—
37	*Microporella malusi* (Audouin).	24	vc	r	r	—	—
38	*Microporella ciliata* (Pallas).	25	vc	r	r	vr	vr
39	*Eurystomella bilabiata* (Hincks).	25	c	r	r	vr	vr
40	*Smittina reticulata* (MacGillivray).	26	—	vr	—	vr	—
41	*Smittina reticulata* var. *ascoporoides* nov.	26	c	r	vr	—	—
42	*Smittina trispinosa* var. *nitida* (Hincks).	27	vc	c	c	r	vr
43	*Smittina trispinosa* var. *acuta* Canu & Bassler.	27	vr	—	—	—	—

		Page	Dizðdð I.	Dizðdð II.	Dizðdð III.	Atebi	Itino-sawa
44	*Smittina porifera* (Hincks).	28	vc	r	vr	r	—
45	*Smittina adeonelloides* (Ortmann).	28	vr	vr	c	r	—
46	*Adeonellopsis pentapora* Canu & Bassler.	29	r	—	r	vr	—
47	*Lagenipora spinulosa* Hincks.	29	vr	—	—	—	—
48	*Lagenipora nipponica* sp. nov.	30	r	—	—	—	—
49	*Mastigophora pesangelis* (Smitt).	31	vc	r	r	—	—
50	*Holoporella tridenticulata* (Busk).	31	vr	—	vr	vr	—
51	*Holoporella subdescostilsii* sp. nov.	32	—	—	—	vr	—
52	*Schismopora tokunagai* sp. nov.	32	c	c	r	vr	—
53	*Osthimosia multiavicularia* sp. nov.	32	c	c	r	r	—
54	*'Costazia' geminata* (Ortmann).	33	vr	—	c	—	—
55	*Flabellopora transversa* Canu & Bassler.	33	—	—	c	r	—
56	*Flabellopora* sp. α.	34	—	vr	—	—	—
57	*Conescharellina crescens* sp. nov.	35	r	vr	r	vr	—
58	*Conescharellina kadusensis* sp. nov.	35	vr	—	c	vc	—
59	*Myriozoum subgracile* d'Orbigny.	36	r	—	—	—	—
	CYCLOSTOMATA						
60	*Stomatopora granulata* (Milne-Edwards).	37	r	vr	vr	—	—
61	*Proboscidea coapta* Canu & Bassler.	37	r	c	—	vr	—
62	*Proboscidea* sp.	37	r	—	—	—	—
63	*Filisparsa ortmanni* sp. nov.	38	c	vr	r	—	—
64	*Tubigerina rugosa* Canu & Bassler.	38	—	vr	—	r	—
65	*Filifascigera grandiosa* sp. nov.	38	r	—	—	vr	—
66	*Reptotubigera philippsae* Harmer.	39	c	r	r	r	—
67	*Idmonea milneana* d'Orbigny.	39	—	—	—	r	—
68	*Entalophora delicatula* Busk.	39	r	r	vr	vr	—
69	*Entalophora nipponica* sp. nov.	40	r	—	c	vr	—
70	*Tubulipora pacifica* Robertson.	40	r	—	—	—	—
71	*Tubulipora pulchra* MacGillivray.	40	c	vr	—	—	—
72	*Tubulipora flabellaris* (Fabricius).	41	c	r	r	—	—
73	*Berenicea sarniensis* (Norman).	41	c	r	—	vr	—
74	*Berenicea* cfr. *patina* (Lamarck).	42	vr	—	—	—	—
75	*Lichenopora radiata* (Audouin).	42	c	vr	vr	—	—
76	*Lichenopora mediterranea* Blainville.	43	—	vr	vr	—	—
77	*Lichenopora buski* Harmer.	43	r	r	—	—	—

Description of Species.

Order CHEILOSTOMATA BUSK.

Suborder Anasca LEVINSEN.

Division Inovicellata, JULLIEN.

Genus **Aetea** LAMOUROUX, 1812.

1. *? Aetea truncata* (LANDSBOROUGH).

Anguinaria truncata LANDSBOROUGH, 1852. p. 288, pl. 16, fig. 57.
Aetea truncata, HARMER, 1926. "Siboga Expedition. Cheil." p. 196, pl. 13, figs. 5-7. (Bibliography)
Aetea truncata, HASTINGS, 1930. "Cheil. Pol., Panama Canal." p. 702. (Bibliography.)

The diameter of the stolons is generally 0.5-0.6 mm.

Distr. Scandinavia, Atlantic, Mediterranean, Zanzibar, Malaya, Vancouver, California, Panama. The Pliocene of Panama.

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (rare), Atebi (very rare).

Division Malacostega, LEVINSEN.

Genus **Cupuladria** CANU & BASSLER, 1920.

2. *Cupuladria elongata* sp. nov.

(Pl. I, Figs. 1-3)

The zoarium is elongated isosceles-triangular, a little convexed, large, reaching a height of nearly 2 cm. It has the form of a central triangular area, where the zooecia are arranged from the apex towards the base, with a marginal area which slants down slightly (like a hat brim pulled downward) and consists of zooecia in radial rows.

The inner face, which is smooth, is divided into distinct compartments which are very elongated and perforated by 1 to 8 small pores. Zooecia somewhat indistinct, rectangular; vibraculum large, auriculated.

Dimensions[1] (mm).

Zooecium { Lz = 0.62, Wz = 0.34 } Opesium { ho = 0.22—0.28, wo = 0.22 }

The inner face and the zoarial form are very characteristic. The outer face resembles Fig. 3 of *C. transversa* Canu & Bassler

1) Lz = Length of zooecium, Wz = Width of zooecium, ho = height of opesium, wo = width of opesium.

(1929, p. 75). From Dizôdô II perfect colony was obtained.

Occ. Dizôdô II (very rare), Itinosawa (rare).

Genus **Pyrulella** Harmer, 1926.

3. *Pyrulella corbula* (Hincks).

(Pl. I, Fig. 4)

Membranipora corbula Hincks, 1880. A.M.N.H. vol. 6, p. 378, pl. 17, fig. 6.

Membranipora corbula, Waters, 1898. Observations on Membraniporidae. J. L. S. Zool. 26 pp. 167, 658-661, 665, 689, pl. 48, fig. 20.

Pyrulella corbula Harmer 1926. "Siboga Exp. II" p. 225, pl. 14, fig. 4.

Dimensions.

Zooecium { Lz = 0.60—0.66 / Wz = 0.34 } Opesium { hop = 0.32—0.35 / wop = 0.20—0.22 }

The zooecia are not infrequently regenerated.

Distr. Australia, Torres Straits, Japan.

Occ. Dizôdô I (rare), Dizôdô II (very rare), Dizôdô III (very rare).

Genus **Ellisina** Norman, 1903.

4. *Ellisina curvirostris* (Hincks).

Membranipora curvirostris Hincks, 1862. "Zooph. S-Devon and S-Cornwall." A.M.N.H. p. 29, pl. 7, fig. 4.

Ellisina curvirostris Harmer, 1926. "Siboga Exped." p. 228, pl. 14, fig. 8. (Bibliography)

Ellisina curvirostris, Hastings, 1930. "Cheil. Pol. Panama Canal." p. 711, pl. 7, figs. 28-31.

Callopora curvirostris Canu & Bassler, 1927. "Br. Maroc & Mauritanie." p. 14.

Callopora curvirostris, Do., 1927. "Br. Hawai." p. 3, pl. 1, fig. 2.

Callopora curvirostris, Do., 1928. "Gulf of Mexico." p. 32, pl. 3, figs. 9 & 10; ?pl. 32, fig. 8.

Typical specimens.

Distr. Atlantic, Mediterranean, Indian Ocean, W. Pacific, Galapagos Is.

Geol. range. Pliocene-Recent.

Occ. Dizôdô I (rare), Dizôdô II (rare), Atebi (very rare).

Genus **Tegella** Levinsen, 1909.

5. *Tegella robertsoni* O'Donoghue & Elsie O'Donoghue.

(Pl. I, fig. 5)

Membranipora occultata (preoccupied) Robertson, 1908. "Incrust. Br." p. 262, pl. 14, figs. 6-9.

Membranipora occultata O'Donoghue & Elsie O'Don., 1923. "Prel. List, Vanconver Isl." p. 25.

Tegella robertsoni Do., 1926. "Second List, Vancouver Isl." p. 36.

Dimensions.

$$\text{Zooecium} \begin{cases} \text{Lz} = 0.66 \\ \text{Wz} = 0.44 \end{cases}$$

The peristome, in which the ovicell and the avicularium are embedded, is well developed. There are two lateral rosette-plates.

Distr. California, Vancouver.

Occ. Dizôdô I (very rare), Atebi (very rare).

6. "*Tegella*" *kadusensis* sp. nov.

(Pl. I, figs. 6, 7)

The zoarium encrusts shells; zooecia delicate, thin, distinct, elongated elliptical. The opesia, which occupy the whole front are surrounded by thin margins bearing 6 or 7 paired spines. The latter grow erect, but soon bend inwards over the opesia and anastomose with one another in the median line. The avicularia, invariably situated on the protuberance above the zooecium, turn diagonally upwards. The ovicell, which is hyperstomial, has an incompletely calcified area, covered with an avicularium, as above mentioned. Uniporous rosette-plates?

Dimensions.

$$\text{Zooecium} \begin{cases} \text{Lz} = 0.50\text{–}0.59 \\ \text{Wz} = 0.23\text{–}0.27 \end{cases}$$

Remarks. Of only two colonies of this curious species obtained, one is ovicelled. In its avicularia and the arrangements of zooecia, this species resembles at a glance *Cupuladria canariensis* (Busk). The anastomosing character of the spines (costules?) recalls *Membraniporella*. Owing to its avicularia, rosette-plates, and numerous spines the generic affinity of my species is open to question.

Occ. Dizôdô I (very rare).

Genus **Amphiblestrum** Gray, 1848.

7. *Amphiblestrum canui* sp. nov.

(Pl. I, Fig. 9; text-fig. 1)

The zoarium encrusts shells. Zooecia distinct, bordered by raised rims and separated by deep furrows; opesium large, more or less trifoliated and minutely crenulated internally; cryptocyst concave, finely granulated; ovicell hyperstomial, globular, a little transverse, sometimes bearing a ridge of chestnut shape; avicularium interzooecial, elongated situated on one of the lateral sides of anterior part of zooecium; mandible directed distally and curved inwards. There are one distal and two pairs of lateral pore-chambers.

Dimensions.

Zooecium { Lz = 0.50—0.58 / Wz = 0.33—0.42 } Opesium { ho = 0.23—0.28 / wo = 0.20—0.28 }

Fig. 1
Amphiblestrum canui sp. nov.
×17

Remarks. The position of the avicularium does not agree with the definition of the genus. (The avicularium of *Amphiblestrum* is usually situated behind the zooecium). But the other zooecial characters indicate that my specimens belong to *Amphiblestrum*. *A. canui* sp. nov. resembles *A. curvatum* from the Vicksburgian of North America (Canu & Bassler, 1920. p. 162, pl. 31, fig. 4.) but differs in its larger size and the shape of the opesium.

The ancestrula is a small thin (or low) ordinary zooecium.

Occ. Dizôdô I (common), Dizôdô II (very rare), Dizôdô III (rare), Atebi (very rare).

Genus **Rhamphonotus** Norman, 1894.

8. *Rhamphonotus okadai* sp. nov.

(Pl. I, Fig. 8; text-fig. 2)

The zoarium encrusts shells. Zooecia oblong, separated by a furrow (between the mural rims or a rounded keel formed by their junction); opesium large, elliptical or elongated hexagonal, broad proximally, with finely crenulated margins. Below the opesium, is a protuberance directed distally, and provided with a large avicularian pore on its top. On each lateral side of this pore is a smaller perforation that is frequently

on one side only, rarely lacking on both sides. The ovicell, which is hyperstomial, orbicular or subquadrate, opens above the opesium. Two pairs of pore-chambers occur on the distal half of the lateral walls.

Dimensions.

$$\text{Opesium}\begin{cases}\text{hop} = 0.40—0.66\\ \text{wop} = 0.27—0.43\end{cases}$$

Remarks. The proximal protuberance resembles the basal part of the flagellum as seen in *Electra pilosa* LINNAEUS. But in the present case, it is a trace of the avicularium. The significance of the lateral pores is obscure. The frontal cryptocyst is not well developed. For this reason I have some doubts as to its generic position.

Occ. Dizôdô I (common), Dizôdô II (rare).

Fig. 2
Rhamphonotus okadai sp. nov.
×17

Division Coilostega, LEVINSEN.

Genus **Onychocella** JULLIEN, 1881.

9. ***Onychocella subsymmetrica*** CANU & BASSLER.

(Pl. II, Fig. 1)

Onychocella subsymmetrica CANU & BASSLER, 1929. "Bry. Philippine." p. 124, pl. 12, figs. 7, 8; text-fig. 30.

Dimensions.[1] $\text{Opesium}\begin{cases}\text{ho} = 0.12—0.17\\ \text{wo} = 0.10—0.17\end{cases}$

$\text{Zooecium}\begin{cases}\text{Lz} = 0.46—0.56\\ \text{wz} = 0.33—0.40\end{cases}$

$\text{Opesium of Onychocellarium}\begin{cases}\text{hoo} = 0.15—0.25\\ \text{woo} = 0.07—0.13\end{cases}$

$\text{Onychocellarium}\begin{cases}\text{Lon} = 0.56—0.63\\ \text{won} = 0.23—0.33\end{cases}$

This species is distinguished from *Onychocella angulosa* REUSS and *O. dupliciter* CANU & BASSLER by its dimensions lying between the two species and by the subsymmetric form of its opesia. But the large opesia become sometimes fairly dissymetric. Every distal and lateral (distal

1) hoo and woo. Height and width of opesium of onychocellarium. Lon and Won. Length and width of onychocellarium.

half) wall bears one rosette-plate.

Distr. Philippines.

Occ. Dizôdô I (very common), Dizôdô II (common), Dizôdô III (common), Atebi (common), Itinosawa (very rare).

Genus **Micropora** Gray, 1848.

10. ***Micropora coriacea*** (Esper).

(Pl. II, Fig. 8)

Flustra coriacea Esper, 1971. "Die Pflanzenthiere."

Micropora coriacea, Canu & Bassler. "Early Tert." p. 235, pl. 4, figs. 20—22. (Bibliogaphy)

Micropora coriacea, Hastings, 1930. "Panama Canal." p. 719.

Distr. Atlantic, Mediterranean, Antarctic, E. pacific.

Occ. Dizôdô I (very common), Dizôdô II (rare), Dizôdô III (rare), Atebe (rare).

Genus **Rosseliana** Jullien, 1888.

11. ***Rosseliana sibatai*** sp. nov.

(Pl. II, Figs. 2-4)

The zooarium encrusts shells. Zooecia variable in size, distinct, alternate, sub-hexagonal, rounded distally and truncated proximally; frontal cryptocyst a little depressed and raised margin of distal half of zooecium both granulated; opesium transverse, semielliptical or ladder-shaped, with a proximal margin, straight or slightly concave at middle, bearing two indentations on both corners.

Ovicelled zooecium same size as ordinary zooecium; its opesium large, ladder-shaped, or triangular; ovicell transverse, short. Surrounding the marginal wall are about 10 uniporous rosette-plates.

Dimensions.

$$\text{Zooecium}\begin{cases} \text{L z}=0.43—0.50 \\ \text{W z}=0.27—0.37 \end{cases}$$

$$\text{Opsium}\begin{cases} \text{h o}=0.08—0.10 \\ \text{w o}=0.17—0.22 \end{cases}$$

$$\text{Opesium of ovicelled zooecia.}\begin{cases} \text{h o}=0.17—0.18 \\ \text{w o}=0.23—0.25 \end{cases}$$

Remarks. The ancestrula is a small ordinary zooecium. The zooecia vary in size, those adjacent to the ancestrula, especially, being smaller than the others. The granulations which are rather constant, not infrequently form small transverse ribs on the margin that are more elevated above the opesium than elsewhere. The regeneration phenomena may be easily observed.

Affinity. The present new species differs from *Rosseliana parvipora* Canu & Bassler (1920, p. 228, pl. 82, fig. 16) in its larger size, and from *R. rosselii* (Audouin) in the ovicell and the form of the opesium.

As to the form of the opesium in *R. rosselii*, Dr. Hincks maintains that it is "longer than broad" (1880, p. 166); Dr. Cipolla (1921, p. 163) on the other hand gives measurements in which the opesium is broader than long. The opesium of a specimen in my collection from off the Kii Peninsula, Japan, has dimensions resembling those given by Dr. Cipolla, namely, ho=0.15—0.18, wo=0.20—0.25, with large zooecia (Lz=0.60—0.73, Wz=0.36—0.43). I think that this specimen belongs to *R. sibatai* sp. nov, or a variety of it, seeing that its ovicell does not differ from that in the fossil specimens. The form of the opesium probably does not play such a decisive rôle in the specific determination as may be supposed.

This species is named in memory of the late Mr. Kôiti Sibata, who was a classmate of mine in the Geological Institute, Tokyo Imperial University.

Distr. Off Kii Peninsula.

Occ. Dizôdô I (very common), Dizôdô II (very rare), Dizôdô III (common).

Fig. 3
Verminaria areolae sp. nov.
×17

Genus **Verminaria** Jullien, 1888.

12. ***Verminaria areolae*** sp. nov.

(Pl. II, Fig. 5; text fig. 3)

The zoarium encrusts shells or stones. Zooecia distinct, elongated oblong, separated by a furrow; The frontal wall is the cryptocyst, depressed, almost flat finely granulated, perforated marginally by a few areolar pores and two rounded opesiules. It is bordered by broad raised margins; aperture transverse, semielliptical with straight proximal border; peristome rather thin, bears two lateral tuberosities; one elliptical avicularium with pivot above aperture. About 5 uniporous rosette-plates on each lateral wall and one or two on distal wall; ovicell wanting.

Dimensions.[1] Zooecium { Lz = 0.60—0.73
Wz = 2.27—0.40

1) ha = height of aperture ; wa = width of aperture.

Aperture $\begin{cases} \text{ha} = 0.07 \\ \text{wa} = 0.13—0.15 \end{cases}$

Remarks. The present species resembles *Microporina elongata* (Hincks) in the form and position of the avicularium and the opesium. I have placed it nevertheless, owing to the existence of the areoral pores, under the genus *Verminaria* Jullien.

Distr. Misaki, Kanagawa Prefecture (Pacific Coast of Japan).

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (very rare), Atebi (very rare).

Genus **Labioporella** Harmer, 1926.

13. ***Labioporella elegans*** sp. nov.

(Pl. II, Fig. 6; text-fig. 4)

The zoarium encrusts shells and stones. Zooecia arranged in longitudinal rows, alternate, elongated rectangular with arched distal margin, surrounded by wide, very finely tuberculated cryptocyst; polypidian tube submedian; lateral recesses not reaching basal wall; horizontal cryptocyst closely punctured even in lateral recesses.

Dimensions. Zooecium $\begin{cases} \text{Lz} = 0.75—1.08 \\ \text{Wz} = 0.27—0.50 \end{cases}$

No avicularium found; but in other zooecial features, my specimens, recent and fossil, do not agree with any of the species of *Labioporella* hitherto described.

The junction of the descending cryptocyst with the basal wall varies greatly. In the zooecia that are longitudinally arranged (consequently narrow), the junction is almost always a transverse line (text-fig. 4a), but in broader zooecia, it is not continuous, being frequently directed proximally.

The lateral walls are provided with two multiprous rosette-plates.

Distr. Misaki, Kanagawa prefecture (20-30 m.) Kii Peninsula.

Occ. Dizôdô I (very rare), Dizôdô III (very rare).

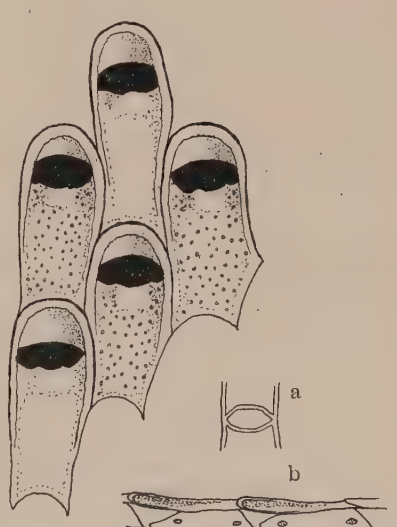


Fig. 4
Labioporella elegans sp. nov.
a. Basal view; the junction of the descending cryptocyst and the basal wall is continuous.
b. Lateral view, showing two multiporous rosette-plates.

Genus **Thalamoporella** Hincks, 1887.

14. *Thalamoporella lioticha* (Ortmann).

Micropora lioticha Ortmann, 1890. "Jap. Bry." p. 30, pl. 2, figs. 11a-b.
Micropora lioticha, Okada, 1923. "Straits of Corea." p. 225.
Thalamoporella lioticha Levinsen, 1909. "Studies on Cheilo." p. 179, pl. 6, figs. 7a-7b; pl. 6b, fig. 4a.
Thalamoporella lioticha, Canu & Bassler, 1929. "Bry. Philippine." p. 150, pl. 17, figs, 1, 2.

My specimens are of either prismatic or compressed branches, one of which bears well preserved ovicells. The micrometric measurements agree exactly with those given in Levinsen's work.

Distr. Japan: Sagami Bay, Kagosima Bay, Straits of Corea, Cape of Tsiuka (Canu & Bassler). Goto Isl. (Levinsen), Sirun Isl., Sulu Archipelago, Tawi Tawi Group.

Occ. Dizôdô I (very rare), Dizôdô II (rare).

15. *Thalamoporella dizodoensis* sp. nov.

(Pl. II, Fig. 7; text-fig. 5)

The zoarium encrusts shells. Zooecia distinct, separated by furrow, large, elongated rectangular and arranged in rows; mural rim thin and raised; cryptocyst depressed, flat, smooth or finely granulated and punctured with fine pores; aperture semielliptical, more or less transverse, its proximal border straight and bearing two small indentations on both extremities; peristome thin, elevated, containing two lateral tuberosities. Above the aperture is a gmall cavity; opesiules round, not very large.

The avicularium has nearly the same size as the zooecium, with a mandible directed distally, and tapering abruptly near the top.

Dimensions.

Zooecium	Lz	0.83–0.92
	Wz	0.37–0.42
Aperture	ha	0.13–0.17
	wa	0.17–0.18
Avicularium	Lav	0.92
	Wav	0.26

Remarks. In the form and dimensions of the avicularium, this species differs from other *Thalamoporella*, in which the proximal border of the aperture is straight. No ovicell was found.

One subspecies of this form now lives off the Kii Peninsula, Japan.

Occ. Dizôdô I (common), Dizôdô II (very rare), Dizôdô III (rare).

Genus **Monoporella** HINCKS, 1881.

16. ***Monoporella fimbriata*** CANU & BASSLER.

(Pl. IV, Fig. 1)

Monoporella fimbriata CANU & BASSLER, 1927. "Classification Cheilo. Bry." p. 4, pl. 1, fig. 2.

Monoporella fimbriata Do., 1929. "Philippine" p. 156, pl. 17, figs. 6—9.

Monoporella fimbriata var. *carinifera* Do., 1929. "Philippine." p. 157, pl. 17, fig. 11.

Dimensions.

Zooecium (mean value) { Lz = 0.83 / Wz = 0.67 } Aperture { ha = 0.10 / wa = 0.15—0.17 }

In our specimens, the oral spines and the indentation of the proximal border of the aperture can hardly be distinguished. The ancestrula is a small ordinary zooecium; the ovicell rather flat, large, distally fringed, the lateral sides of which have no calcareous wall. Of pore-chambers, there are one distal and two latetal (one on each side) perforated by a slit-like rosette-plate. A large and obtuse tuberosity sometimes occurs on each side of the aperture.

Fig. 5.
Thalamoporella dizodoensis. sp. nov.

In zooecia, on one and the same zoarium, are not infrequently both typical and "*carinifera*" forms.

According to Drs. CANU and BASSLER, the distribution of this species is limited to the southern part of the Sulu Archipelago.

Occ. Dizôdô I (very common), Dizôdô II (common), Dizôdô III (rare), Atebi (rare).

Division Pseudostega LEVINSEN, 1909.

Genus **Cellaria** ELLIS & SLANDER, 1786.

17. ***Cellaria triangularis*** ORTMANN.

Cellaria triangularis ORTMANN, 1890. "Japan. Bry." p. 32, pl., fig. 13.
Cellaria triangularis, OKADA, 1923. "Straits of Corea." p. 225.
Cellaria triangularis, Do., 1933. "Bry. Shimoda." p. 11, pl. 1, fig. 8.

Dimensions. Zooecium $\begin{cases} Lz = 0.42 \\ Wz = 0.27 \end{cases}$

Width of zoarium = 0.84

Though our specimens lack avicularia, their zooecial characters agree well with those of recent specimens from Misaki. They are distinguished from *Cellaria japonica* Canu & Bassler by the shape of the aperture.

Distr. Japan: Hokkaido, Honsyû, Kyûsyû.

Geol. range. Pliocene-Recent (Japan).

Occ. Dizôdô I (very common), Dizôdô III (common), Atebi (common), Itinosawa (very rare).

Division Cellularina Smitt, 1876.

Genus **Caberea** Lamouroux, 1816.

18. *Caberea lata* Busk.

(Pl. III, Fig. 7)

Caberea lata Busk, 1852. "Rattlesnake" p. 378.

Caberea lata, Do., 1852. "Cat. Mar. Pol." p. 39, pl. 47, figs. 1–3.

Caberea lata, Harmer, 1926. "Siboga Exp. Cheilo." p. 360, pl. 24, figs. 7–9. (Bibliography)

Carberea lata Ortmann, 1890, "Jap. Bry." p. 22, pl. 1, figs. 5a–c.

Dimensions.

Zooecium $\begin{cases} Lz = 0.40 \\ Wz = 0.15–17 \end{cases}$ Opesium $\begin{cases} ho = 0.25–0.27 \\ wo = 0.11 \end{cases}$

The external opesium is very elongated.

Distr. Japan (Pacific Coast): Misaki, Sirahama, off Kii Peninsura. Australia, New Zealand, Queensland, Indian Ocean, Torres Straits, Malay Arch., China Sea.

Occ. Dizôdô I (common).

Division Cribrimorpha Lang, 1916.

Genus **Puellina** Jullien, 1886.

19. *Puellina radiata* (Moll).

Eschara radiata Moll, 1803. Die Seerinde. p. 63, pl. 4, fig. 7.

Puellina radiata Canu & Bassler, 1920. "Early Tert." p. 295, pl. 41, figs, 14–18. (Bibliography)

Puellina radiata, Do., 1928. "Gulf of Mexico." p. 73, pl. 10, fig. 11.

Puellina radiata, Do., 1929. "Bry. Philippine." p. 238, pl. 22, fig. 1.

Puellina radiata, Do., 1930. "Garapagos Isl." p. 13.

Puellina radiata, O'Donoghue & Elsie O'Don. 1926. "Sec. List, Vancou-

ver Isl." p. 51.

Colletosia radiata Harmer, 1926. "Siboga Exped." p. 475, pl. 34, figs. 15–18. (Bibliography)

Distr. Cosmopolitan.

Occ. Dizôdô I (common).

Genus **Figularia** Jullien, 1886.

20. *Figularia* cfr. *biporosa* (Okada).

Cribrilina biporosa Okada, 1923. "Straits of Corea." p. 226, fig. 6.

Only one specimen, encrusting a shell of a bivalve, agrees with *C. biporosa* Okada in the characters of the costules and lacunae, but the characteristic ovicell was unfortunately not found.

Distr. Straits of Corea.

Occ. Atebi (very rare).

Genus **Membraniporella** Smitt, 1873.

21. *Membraniporella subpetasus* sp. nov.

(Pl. III, Fig. 9.)

The zoarium encrusts shells. Zooecia elliptical, distinct, separated by deep furrow or surrounded by the gymnocyst. The frontal wall is quite convex. Costules 12–14 in number, with large lumen pore, separated by broad lacunae reaching middle of costules; opesium transverse with concave proximal margin; peristome bears 4 spines, the two laterals of which are larger than the others; ovicell hyperstomial, subquadrate, with triangular area; two spines of the ovicelled zooecia bifid. There are, rarely, elongated and oval avicularia on the gymnocyst.

Dimensions.

$$\text{Zooecium} \begin{cases} \text{Lz} = 0.50\text{–}0.58 \\ \text{Wz} = 0.37\text{–}0.42 \end{cases}$$

$$\text{Aperture} \begin{cases} \text{ha} = 0.10 \\ \text{wa} = 0.22 \end{cases}$$

Affinity. In their dimensions and apertural features, this species is closely allied to *Membraniporella petasus* Canu & Bassler, 1928. It differs from the latter in the number of costules, the regular lumen pores, and the existence of the avicularia.

Occ. Dizôdô I (rare).

Suborder Ascophora LEVINSEN.

Genus **Hippothoa** HINCKS, 1880.

22. *Hippothoa? divaricata* LAMOUROUX.

Hippothoa divaricata LAMOUROUX, 1821. "Expos. méth." p. 82.
Hippothoa divaricata, JELLY, 1889. "Synon. Cat." p. 111. (Bibliography)
Hippothoa divaricata, WATERS, 1918. "Cape Verde Isl." p. 20 (Bibliography)
Hippothoa divaricata, CANU & BASSLER, 1928. "Gulf of Mexico." p. 77, pl. 28, fig. 7.
Hippothoa distans, CANU & BASSLER, 1927. "Bry. Hawai." p. 13, pl. 1, fig. 3.

Only one colony, encrusting *Chlamys vesiculosus,* was obtained. The zooecia are much smaller [Lz(except the caudal part) = 0.28, Wz =0.2] than those described as *H. distans* MACGILL. by CANU & BASSLER (1927, p. 13). As to removing this species from *H. distans,* I wish to leave it until further studies have been made.

Distr. Cosmopolitan.
Occ. Dizôdô I (very rare).

23. *Hippothoa flagellum* MANZONI.

Hippothoa flagellum MANZONI, 1870. "Bry. foss. Ital." p. 6, pl. 1, fig. 4.
Hippothoa flagellum, JELLY, 1889. "Synon. Cat." p. 112. (Bibliography)
Hippothoa flagellum, CANU & BASSLER, 1929. "Bry Philippine." p. 247, pl. 247, pl. 22, fig. 7. (Bibliography)

The ovicell is longitudinally carinated.

Distr. Cosmopolitan.
Occ. Dizôdô I (common), Dizodo III (rare).

Genus **Chorizopora** HINCKS, 1880.

24. *Chorizopora brongniarti* AUDOUIN.

Flustra brongniarti AUDOUIN, 1826. "Expl." p. 240.
Lepralia brongniartii BUSK, 1854. "B.M.Cat. II" p. 65, pl. 81, figs. 1–5.
Chorizopora brongniartii HINCKS, 1880. "B.M.P." p. 224, pl. 32, figs. 1–4.
Chorizopora brongniartii, JELLY, 1889. "Syn. Cat." p. 62.
Chorizopora brongniartii, CANU & BASSLER, 1925. "Maroc." p. 23, pl. 7, fig. 2.
Chorizopora brongniartii, Do., 1930. "Galapagos Isl." p. 14.

Dimensions.

Zooecium { Lz = 0.50 / Wz = 0.33 } Aperture { ha = 0.04 / wa = 0.10 }

Only one encrusting zoarium, greatly resembling Fig. 2 in HINCKS' work cited above.

Distr. Mediterranean. Adriatic. S–W France. Galapagos Is.

Occ. Dizôdô I (very rare).

Genus **Petraliella** CANU & BASSLER, 1927.

25. ***Petraliella*** cfr. ***philippinensis*** CANU & BASSLER.

(Pl. III, Fig. 6)

Petraliella philippinensis CANU & BASSLER, 1929. "Bry. Philippine." p. 261, pl. 25, figs. 3–10.

Dimensions.

Zooecium { Lz = 1.00 / Wz = 0.67 } Aperture { ha = 0.25 / wa = 0.34 }

Only one colony, consisting of a few zooecia and encrusting a shell was obtained. About seven uniporous rosette-plates are on each lateral wall. Although my specimen has not the large avicularia described by CANU & BASSLER, in other respects, such as the size, the avicularian umbo, and the aperture, it agrees well with *P. philippinensis.*

Distr. Jolo, Sulu Archipelago, Tawi Tawi Group, Borneo. (34–618 meters.)

Occ. Dizôdô I (very rare).

Genus **Schizoporella** HINCKS, 1887.

26. ***Schizoporella costulata*** CANU & BASSLER var. ***distincta*** nov.

(Pl. IV, Figs. 4, 5)

The zoarium encrusts shells, especially small gastropods. Zooecia large, separated by deep furrow, elongated elliptical; fontal wall convex, smooth, bordered by areolae; aperture large, elliptical, a little removed from distal margin of zooecium, divided into large anter and small poster by two distinct lateral cardelles; nearly as many pore-chambers as areolae. Ovicell and avicularium wanting.

Dimensions.

Zooecium { Lz = 0.56–0.73 / Wz = 0.33–0.43 }

Aperture { ha = 0.19 / wa = 0.14 }

Remarks. Rarely the frontal wall is costulated. This species closely resembles *Schizoporella costulata* CANU & BASSLER.[1] It differs

from the latter in its larger dimensions and the existence of cardelles.

Occ. Dizôdô I (common), Dizôdô III (rare), Atebi (rare), Itinosawa (rare).

Ganus **Arthropoma** Levinsen, 1909.

27. ***Arthropoma cecilii*** (Audouin).

Flustra cecilii Audouin, 1826. "Expl." p. 239.

Arthoropoma cecilii, Canu & Bassler, 1929. "Bry. Philippine." p. 296, pl. 32, fig. 1.

Distr. Cosmopolitan.

Occ. Dizôdô I (very rare).

Genus **Schizopodrella** Canu & Bassler, 1917.

28. ***Schizopodrella ternata*** (Ortmann).

(Pl. III, Figs. 2, 3.)

Schizoporella ternata Ortmann, 1890. "Japan. Bry." p. 48, pl. 3, fig. 34.

Dimensions. Zooecium $\begin{cases} \text{Lz} = 0.34\text{–}0.58 \\ \text{Wz} = 0.25\text{–}0.42 \end{cases}$

Aperture $\begin{cases} \text{ha} = 0.07 \\ \text{wa} = 0.08 \end{cases}$

Frontal wall slightly convex, formed of granular tremocyst perforated by fine pores; median avicularium situated on an eminence; ovicell hyperstomial, thin, circular with flat semilunal area which is lacking in the granular tremocyst; from 4–6 distal and 6–10 lateral rosette-plates.

Distr. Japan: Sagami Bay, Kanagawa Prefecture. 100 fms. (Ortmann).

Occ. Dizodo I (rare), Dizôdô II (rare).

29. ***Schizopodrella spathulata*** sp. nov.

(Pl. III, Fig. 8; text-fig. 6)

The zoarium encrusts shells and stones, frequently covering them entirely. It is sometimes formed of layers. Zooecia distinct, separated by furrow, rounded, polygonal or orbicular; frontal wall consisting of developed and shining tremocyst, is convexed and ornamented with large tubercles; aperture circular with small fan-shaped rimule, situated obliquely to zoarial surface; ovicell hyperstomial, globose, opens above aperture; avicularium frontal, larger than aperture, spathulated with mandible directed proximally.

1) 1929. p. 317, pl. 36, figs. 10, 11.

Dimensions. Zooecium { Lz = 0.43–0.50
Wz = 0.34–0.42

Aperture { ha = 0.12–0.13
wa = 0.10–0.12

Avicularium { lav = 0.22
wav = 0.12

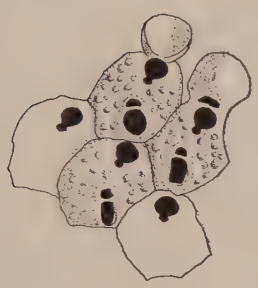


Fig. 6
Schizopodrella spathulata sp. nov.

Remarks. Zooecia without avicularium are rather rare. The apertural form is characteristic, resembling the aperture of *Hippomenella porcellana* (Busk), although in the latter species, the aperture is divided by the cardelles into two parts, anter and poster.

Occ. Dizôdô I (common), Dizôdô III (rare), Itinosawa(very rare).

Genus **Gemellipora** Smitt (part), 1872.

30. ***Gemellipora minutipora*** Canu & Bassler.

Gemellipora minutipora Canu & Bassler, 1929. "Bry, Philippine." p. 312, pl. 35, figs. 1–2.

Dimensions. Zooecium { Lz = 0.46–0.63
Wz = 0.43–0.50

Aperture { ha = 0.17
wa = 0.11

The zoarium is formed of bilamellar, compressed, bifurcated branches or encrusts fragments of shell.

Distr. Destacado Isl. (80–135 fms.).

Occ. Dizôdô I (very rare), Itinosawa (very rare).

Genus **Stephanosella** Canu & Bassler, 1917.

31. ***Stephanosella biaperta*** (Michelin).

Eschara biaperta Michelin, 1840–47. "Icon. Zooph." p. 330, pl. 79, fig. 3.

Stephanosella biaperta Canu & Bassler, 1923. "Later Tert. & Quat." p. 99, pl. 16, figs. 4–9. (Bibliography)

Stephanosella biaperta O'Donoghne & Elsie O'Don. 1926. "Second List, Vancouver Isl." p. 58.

Stephanosella biaperta Hastings, 1930. "Cheilo. Pol. Panama Canal." p. 721.

Schizoporella biaperta, O'Don. & Elsie O'Don., 1923. "Preliminary List,

Vancouver Isl." p. 35.

Dimensions. Zooecium { Lz = 0.50–0.56 / Wz = 0.34–0.40 }

Aperture { ha = 0.10 / wa = 0.10 }

The frontal wall is smooth or finely punctured. The frontal avicularium, situated on an eminence, is a very commonly occurrence. Except the difference in size, my specimens agree well with the figures of *S. indistincta* C. & B. (1929, p. 314, pl. 35, figs. 7, 8) from the Japan Sea.

Immediately above some of the zooecia is a small pore, the origin of which is unknown.

Distr. Cosmopolitan.

Occ. Dizôdô I (common), Dizôdô II(common), Dizôdô III (very rare), Atebi (rare).

Genus **Lacerna** Jullien, 1888.

32. ***Lacerna signata*** (Waters).

Smittia signata Waters, 1889. "New South Wales." A.M.N.H. [6] vol. 4. p. 17, pl. 3, fig. 4.

Lacerna signata Canu & Bassler, 1929. "Bry. Philippine." p. 308, pl. 42, figs. 10, 11.

Some encrusting specimens were obtained, corresponding exactly to the descriptions and figures of this species.

Distr. Australia and the Philippines.

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (very rare).

33. ***Lacerna granulosa*** sp. nov.

(Pl. IV, Figs. 2,5)

The zoarium encrusts shells. Zooecia distinct, separated by deep furrow, elongated oval, more or less hexagonal; frontal very convex, formed of pleurocyst excessively granulated and provided with a few scattered areolae; aperture semicircular, bordered by 6 oral spines; its proximal border straight and provided with small rounded rimule; small avicularium situated on eminence below aperture; ovicell hyperstomial, large, inflated, globose, granulated similarly to frontal wall.

Dimensions. Zooecium { Lz = 0.66 / Wz = 0.43–0.50 }

Aperture { ha = 0.12 / wa = 0.11 }

Occ. Dizôdô I (common), Dizôdô II (rare).

Genus **Hippoporina** Neviani, 1895.

34. ***Hippoporina porcellana*** (Busk).

(Pl. IV, Fig. 6)

Lepralia porcellana Busk, 1860. "Shetland Pol." Quart. J. Micr. Sci. viii, p. 283, pl. 31, fig. 3.

Hippoporina porcellana Canu & Bassler, 1920. "Early Tert." p. 374.

Hippoporina porcellana, Hastings, 1930. "Cheilo. Pol., Panama Canal." p. 721. (Bibliography)

Lepralia cleidostoma Smitt, 1873. "Flor. Bry." p. 62, pl. 11, figs. 217–219.

Hippoporina cleidostoma, Canu & Bassler, 1928. "Gulf of Mexico." p. 104, pl. 9, fig. 7; pl. 32, fig. 5; text-fig. 18.

Dimensions. Zooecinm { Lz = 0.40–0.50 ; Wz = 0.34–0.40 }

Aperture { ha = 0.09–0.11 ; wa = 0.08–0.10 }

Since the specimens found at Dizodo have an aperture, removed a moderate distance from the distal border of the zooecium, they belong to *H. porcellana* of Canu & Bassler. However, like Waters (1899), Norman (1909), and Hastings (1930), I think that *Lepralia cleidostoma* is only a synonym of *H. porcellana*.

There are fewer zooecia that are provided with an aviculàrium than those without it.

Distr. Atlantic: Madeira, Tizard, Florida, Brazil. Pacific: Queen Charlotte Isl. Pliocene of Panama.

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (rare), Atebi (very rare).

Genus **Hippodiplosia** Canu, 1916.

35. ***Hippodiplosia pertusa*** (Esper).

(Pl. IV, Fig. 4)

Cellepora pertusa Esper, 1791–97. "Pflanzen." p. 149.

Lepralia pertusa, Jelly, 1889. "Synon. Cat." p. 131. (Bibliography)

Hippodiplosia pertusa Canu & Bassler, 1928. "Gulf of Mexico." p. 106, pl. 9, fig. 6, text-fig. 9. (Bibliography)

Hippodiplosia pertusa Hastings, 1930. "Cheilo. Pol., Panama Canal." p. 724, pl. 17, fig. 118.

Distr. Arctic, Atlantic, Suez, Galapagos, Panama.

Occ. Dizôdô I (very rare), Dizôdô III (very rare).

Genus **Exochella** Jullien, 1888.

36. ***Exochella longirostris*** Jullien. var. ***quadricella*** nov.

Literatures on ths original species :—

Exochella longirostris Jullien, 1888. "Cap Horn" p. 55, pl. 3, figs. 1–4.

Exochella longirostris, Levinsen, 1909. "Stud. Cheilo." p. 321, pl. 17, figs. 6a–b.

Dimensions.

Zooecium { Lz = 0.45–0.50 / Wz = 0.25–0.30 } Peristome { hp = 0.06–0.07 / wp = 0.10 }

The zoarium encrusts brachiopods and molluscs. Frontal wall smooth, ovicell is neither perforated nor striated; four pore-chambers on distal half of the zooecium ; frontal avicularia sometimes immersed. The pore-chambers of *Exochella longirostris* are usually three in number. In my specimens, the distal pore-chamber is divided into two small pore-chambers.

Occ. Dizôdô I (common), Dizôdô II (rare), Atebi (very rare).

Genus **Microporella** Hincks, 1877.

37. ***Microporella malusi*** (Sav.–Audouin).

Cellepora malusii Audouin, 1826. "Expl." p. 239.

Microporella malusi, Hincks, 1880. "B.M.P." p. 211, pl. 28, figs. 9–11; pl. 29, figs. 1–2.

Microporella malusi, O' Donoghue & Elsie O'Don., 1923. "Prel. List, Vancouver Isl." p. 32.

Microporella malusi, Okada, 1929. "Mutsu Bay." p. 27, text–fig. 12.

Fenestrulina malusi Jullien, 1888. "Cap Horn." p. 38, pl. 15, figs. 1–3.

Fenestrulina malusi, Canu & Bassler, 1923. "Later Tert. & Quat." p. 115, pl. 36, figs. 2, 3. (Bibliography)

Fenestrulina malusi, Do., 1928. "Gulf of Mexico." p, 112.

Fenestrulina malusi, O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vancouver Isl." p. 63, pl. 5, fig. 45.

Distr. Cosmopolitan.

Occ. Dizôdô I (very common), Dizôdô II (rare), Dizôdô III (rare).

38. ***Microporella ciliata*** (Pallas).

Eschara ciliata Pallas, 1766. "Elenchus." p. 38.
Microporella ciliata, Jelly, 1888. "Synon. Cat." p. 179.
Microporella ciliata, Canu & Bassler, 1923. "Later Tert. & Quat." p. 119, pl. 20, figs. 1–6; pl. 36, figs. 4, 5. (Bibliography)
Microporella ciliata, Okada, 1923. "Straits of Corea." p. 227.
Microporella ciliata, Do., 1929. "Mutsu Bay." p. 26, pl. 2, fig. 5, text-fig. 11.
Microporella ciliata, Do., 1934. "Shimoda." p. 113.
Microporella ciliata, O'Donoghue & Elsie O'Don., 1923. "Prel. List, Vancouver Isl." p. 173.
Microporella ciliata, Do., 1926. "Sec. List, Vancouver Isl." p. 110.
Microporella ciliata, Hastings, 1930. "Cheilo. Pol. Panama Canal." p. 727.

Although this species is very variable, roughly speaking, the following tendencies are recognisable : when the calcification is not very pronounced, the avicularia are small and situated on a level more proximal than the ascopore. When on the contrary, calcification is pronounced and the frontal wall is perforated by large tremopores, the avicularia are on the same level as the ascopore or on a level between the aperture and the ascopore.

Distr. Cosmopolitan.

Occ. Dizôdô I (very common), Dizôdô II (rare), Dizôdô III (rare), Atebi (very rare), Itinosawa (very rare).

Genus **Eurystomella** Levinsen, 1909.

39. ***Eurystomella bilabiata*** (Hincks).

(Text-fig. 7)

Lepralia bilabiata Hincks, 1884. "Queen Charlotte Isl." p. 49, pl. 3, fig. 1.
Lepralia bilabiata, Robertson, 1908. "Incrust. Cheil." p. 298, pl. 21, figs. 61–64.
Lepralia bilabiata, Okada, 1929. "Mutsu Bay." p. 24, pl. 2, fig. 3; text-fig. 10.
Eurystomella bilabiata Levinsen, 1909. "Stud. Cheilo. Bry." p. 314.
Eurystomella bilabiata, Canu & Bassler, 1923. "Later Tert. & Quat." p. 142, pl. 37, fig. 6.
Eurystomella bilabiata, O'Donoghue & Elsie O'Don., 1926. "Second

List, Vancouver Isl." p. 65.

Dimensions. Zooecium {Lz =0.66–0.83 / Wz=0.56–0.60
Aperture {ha =0.13–0.15 / wa=0.22

The size of the zooecia and the aspects of the furrows behind the corners of the aperture are very variable. In my fossil specimens, the straight, very long furrows sometimes attain a height nearly twice that of the aperture. One recent specimen collected near the Misaki Marine Biological Station has furrows as shown in text-figure, but its zooecia are very small: Lz=0.46, Wz=0.30 (in Robertson's figures, the zooecial length reaches nearly 0.8mm). In the Queen Charlotte specimens figured by Dr. HINCKS, the furrows are merely small triangular depressions.

Fig. 7
Eurystomella bilabiata (HINCKS)

Aperture of ovicelled zooecium large, more or less transverse, triangular with thickened and undulated proximal rim; one distal and one each lateral pore-chambers; latter perforated by 7 uniporous rosette-plates.

Distr. Pleistocene: California: Recent: California, Queen Charlotte Isl., Vancouver Isl., Japan (Mutu Bay and Misaki).

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (rare), Atebi (very rare), Itinosawa (very rare).

Genus **Smittina** NORMAN, 1903.

40. ***Smittina reticulata*** (MACGILLIVRAY).

Lepralia reticulata MACGILL., 1842. "Zooph., Aperdeen." p. 467.

Smittia reticulata, JELLY, 1888. "Synon. Cat." p. 250.

Smittia reticulata, NEVIANI, 1900. "Br. neogen., Calabrie." Paleontographia Italica vol. 6, p. 206 (96). (Bibliography)

Smittia reticulata, CALVET, 1907, "Travailleur et Talisman." p. 432, (Bibliography)

Smittina reticulata, CANU & BASSLER, 1929. "Bry. Philippine." p. 337, pl. 39, figs. 8–10. (Bibliography)

Smittina reticulata, OKADA, 1929, "Mutsu Bay" p. 29, text-fig. 14.

Distr. Cosmopolitan.

Occ. Dizôdô II (very rare), Atebi (very rare).

41. ***Smittina reticulata*** MacGill. var. ***ascoporoides*** nov.

Dimensions. Zooecium { Lz = 0.50–0.66 / Wz = 0.23–0.30
Peristome { hp = 0.08 / wp = 0.14

Peristome developed, transverse, elliptical, almost always entire; proximal sinus deformed into round pore fairly removed from proximal margin, resembling ascopore of *Microporellae* but opens in peristomie, although lacking sometimes on zooecia near growing margin; lyrula very broad, occupying nearly whole width of aperture; ovicell large, not very inflated, punctured, embedded in distal zooecium.

Although these specimens belong to *Smittina reticulata* in all essential characters, owing to the broad lyrula when the peristome is fairly developed, its separation as a variety seems only natural.

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (very rare).

42. ***Smittina trispinosa nitida*** (Hincks).

(Pl. V, Fig. 5)

Smittina nitida Hincks, 1881. "Cont. Gen. Hist." A.M.N.H. [5] vol. 7, p. 159, pl. 9, fig. 5.

Smittina trispinosa var. *nitida* Canu & Bassler, 1929. "Bry. Philippine." p. 343, pl. 41, figs. 6–12.

Dimensions. Zooecium { Lz = 0.40–0.51 / Wz = 0.27–0.40
Peristome { hp = 0.10–0.11 / wp = 0.10

All the variations described by Canu and Bassler are observed in my specimens. The large avicularia are narrow, not always spathulated as shown in Canu & Bassler's figures. Fig. 5, Pl. V, somewhat resembles *S. trispinosa acuta* Canu & Bassler. The ovicell is more or less transverse, sometimes provided with a perforated area.

Distr. Africa, Philippines.

Occ. Dizôdô I (very common), Dizôdô II (common), Dizôdô III (common), Atebi (rare), Itinosawa (very rare).

43. ***Smittina trispinosa acuta*** Canu & Bassler.

Smittina trispinosa acuta Canu & Bassler, 1929. "Bry. Philippine." p.

344, pl. 41, figs. 13, 14.
Distr. Philippine Isl.
Occ. Dizôdô I (very rare).

44. *Smittina porifera* (Hincks).

(Pl. V, Fig 3)

Porella marsupium forma *porifera* Hincks, 1884. "Queen Charlotte." p. 50, pl. 4, fig. 4.

Porella marsupium var. *porifere*, Waters, 1887. "New Zealand" Q. J. Geol. Soc. vol. 40, p. 63.

Smittina porifera, Canu & Bassler, 1923. "Later Tert. & Quat." p. 147, pl. 38, fig, 9:

Dimensions. Zooecium { Lz = 0.46–0.50 / Wz = 0.27–0.33

Width of peristome = 0.12–0.13

There are usually two frontal pores, rarely 3 or 4. The areolae are distinct. In the figure of Drs. Canu & Bassler, the arolae are not recognisable, although described in the text (1923, p. 147). There are one distal and two pairs of lateral pore-chambers. The ancestrula is only a small ordinary zooecium.

My specimens resemble *Porella columbiana* O'Don. (1923, p. 41, pl. 3, fig. 28.) but the latter is easily distinguished by its larger size, its numerous areolae, and by lacking the frontal pores.

Distr. Queen Charlotte Islands.

Geological distribution. Pliocene of New Zealand, Pleistocene of California.

Occ. Dizôdô I (very common), Dizôdô II (rare), Dizôdô III (very rare), Atebi (rare).

45. *Smittina adeonelloides* (Ortmann).

(Pl. V, Fig 2)

Smittia adeonelloides Ortmann, 1890, "Jap. Bry." p. 46, pl. 2, fig. 9.

Smittia adeonelloides, Okada, 1923. "Straits of Corea." p. 227, figs. 1, 2.

?Smittia praestans, Waters, 1889. "New South Wales. IV" A.M.N.H. 5 vol. 20, p. 17, pl. 3, figs 9–11.

?Escharoides sauroglossa Levinsen, 1909. "Stud. Cheilo." p. 319, pl. 17, figs. 6 a–f.

Dimensions. Zooecium { Lz = 0.83 / Wz = 0.43–0.56

Width of peristome (interior) = 0.22

The zoarium is bilameller, not one-layered, as in the specimens of *Escharoides sauroglossa* of Dr. LEVINSEN. But the description of the latter species, excepting some small differences, applies to my specimens, which are certainly identifiable with *Smittia adeonelloides* ORTMANN, rather common in the central and southern seas of Japan. No oral spines are observed on the Japanese specimens figured in the works cited above. The avicularian mandible of *Escharoides sauroglossa* is broader, and according to Dr. LEVINSEN (1909, p. 319), "there is internally on each side of the sinus a strong, triangular, lateral tooth." In the fossil specimens in hand, no such tooth could be found.

The ovicell, which is hyperstomial, oblong, and covered by the reticulated front of the distal zooecium, opens deeply into the peristomie.

I have placed this species, with some misgivings, under the genus *Smittina*. Dr. LEVINSEN's species may perhaps be a variety of it.

Distr. Sagami Bay (60–200 fms.), Straits of Corea (93 m); 33° 7′N; 129°20′ E and 33°8′N; 129° 20′E (36–40 fm.), Port Phillip, New South Wales, Australia.

Occ. Dizôdô I (very rare), Dizôdô II (very rare), Dizôdô III (common), Atebi (rare).

Genus **Adeonellopsis** MACGILLIVRAY, 1866.

46. *Adeonellopsis pentapora* CANU & BASSLER.

Adeonella tuberculata, ORTMANN, 1890. "Jap. Bry." p. 53, pl. 4, fig. 9. (not of Busk, 1884, "Chall. Pol." p. 180.)

Adeonellopsis pentapora CANU & BASSLER, 1929. "Bry. Philippine." p. 382, pl. 53, figs. 1–5.

A recent specimen from Toyama Bay bears zooecia figured by both Drs. ORTMANN and CANU and BASSLER. The figure by the former is probably the zooecia of the basal part.

Distr. Cape Tsiuka and Toyama Bay, Sea of Japan; Philippines.

Occ. Dizôdô I (rare), Dizôdô III (rare), Atebi (very rare).

Genus **Lagenipora** HINCKS, 1877.

47. *Lagenipora spinulosa* HINCKS.

Lagenipora spinulosa HINCKS, 1884. p. 57, pl. III fig. 4; Do. 1884 p. 31. "Queen Charlotte Islands."

Lagenipora spinulosa, THORNELY, 1905. "Polyz., in Herdman, Rep." Pear Oyst. Fish.

Lagenipora spinulosa, Do, 1907. "Marine Polyz., Indian Mus." Rec. Ind. Mus. vol. 1, p. 188.

Lagenipora spinulosa, Robertson, 1908. "Incrust. Cheilo." p. 283, pl. 18, fig. 37.

Lagenipora spinulosa, Canu & Bassler, 1923. "Later Tert. & Quat." p. 171, pl. 40, fig. 8.

Lagenipora spinulosa, O'Donoghue and Elsie O'Don., 1923. "Preliminary List, Vancouver Isl." p. 23.

Lagenipora spinulosa, Do., 1925. "Puget Sound." p. 106.

Lagenipora spinulosa, Do., 1926. "Second List, Vancouver Isl." p. 110.

Lagenipora spinulosa, Canu & Bassler, 1927. "Bryoz. Hawai." p. 38, pl. VI, fig. 8.

Lagenipora spinulosa, Hastings, 1930. "Panama Canal." p. 730.

Only one colony, encrusting a shell of *Chlamys vesiculosus* and covered by *'Cellepora'*, was obtained at Dizodo I.

The frontal wall is very finely punctured. Two processes, provided with an avicularium, sometimes anastomose near the top, forming a small, round, or oval window at the proximal margin of the peristome.

Distr. Queen Charlotte Is., Vancouver Is., California, Panama, Indian Ocean. Pleistocene of California.

Occ. Dizôdô I (very rare).

48. *Lagenipora nipponica* sp. nov.

(Pl. V, Fig. 1, 7)

Zoarium strong, encrusts shells; zooecia flask-like, distinct, sometimes obliterated by secondary calcifications; frontal wall smooth, convexed, provided with few areolae, ending gradually in peristomie without any boundary line; proximal border of peristomie somewhat everted distally; ovicell small, globular, situated on dorsal side of peristomie on which it opens. Avicularia wanting?

Dimensions Zooecinm. $\begin{cases} \text{Lz} = 0.42\text{–}0.50 \\ \text{Wz} = 0.25\text{–}0.31 \end{cases}$

Diameter of peristome = 0.22–0.24

Remarks. This species differs from *L. spinulosa* Hincks, in its unpunctured frontal wall and from *L. lucida* (Hincks) in the absence of the transverse line at the base of the peristomie.

As the peristomes in my specimens could scarcely be found, the presence of the avicularium could not be ascertained.

Occ. Dizôdô I (rare).

Genus **Mastigophora** Hincks, 1880.

49. ***Matsigohora pesangelis*** (Smitt).

Hippothoa pesangelis Smitt, 1873. "Floridan Bry." p, 42, pl. 7, figs. 159, 160.

Mastigophora pesangelis, Canu & Bassler, 1928. "Gulf of Mexico." p. 133, pl. 21, fig. 9; pl 34, fig. 4.

Mastigophora pesangelis, Do., 1929. "Bry. Philippine." p. 412, pl. 58, figs. 4-8. (Bibliography)

Mastigophora pesangelis, Hastings, 1930. "Panama Canal." p. 722, pl, 11,fig. 60.

Escharina pesangelis, Osburn, 1914. "Tortuga Isl." Papers from the Tortugas Lab. vol. 5, p. 207. (Bibliography)

Seven oral spines are observed.

This species varies greatly in size, the dimensions of my species lying between those of *Mastigophora pesangelis* and *M. grandicella* as measured by Drs. Canu & Bassler, 1929. The separation of the latter species merely on the strength of its larger dimensions may perhaps be questioned.

Distr. Philippines, Hawai, Panama, Galapagos, Indian Ocean, Madeira, Florida.

Occ Dizôdô I (very common), Dizôdô II (rare), Dizôdô III (rare).

Genus **Holoporella** Waters, 1909.

50. ***Holoporella tridenticulata*** Busk.

Cellepora tridenticulata Busk, 1881. "Chitinous Organs in the Cheilo." Jour. Linn. Soc. XV, p. 347, pl. 26, fig. 9.

Cellepora tridenticulata, Do., 1884. "Challenger." p. 188, pl. 29, fig. 3, ; pl. 35, fig. 17.

Cellepora tridenticulata, MacGillivray, 1886, "Prod. zool. Vict." [13] p. 110, pl. 128, fig. 3.

Holoporella tridenticulata Canu & Bassler, 1930. "Galapagos Isl" p. 39, pl. 7, figs. 2, 3. (Bibliography)

Dimensions.

$$\text{Zooecium}\begin{cases} \text{Lz}=0.90 \\ \text{Wz}=0.43\text{–}0.60 \end{cases} \qquad \text{Aperture}\begin{cases} \text{ha}=0.18 \\ \text{wa}=0.18 \end{cases}$$

My specimens closely follow the figures of Galapagos' specimens described by Drs. Canu & Bassler. The oval avicularium, situated on the mucronate process just below the aperture, bears a pivot, its beak pointing proximally. There are two oral spines.

Distr. Australia, Torres Straits, Galapagos.

Geological range. Miocene—Recent.

Occ. Dizôdô I (very rare), Dizôdô III (veryrare), Atebi (very rare).

51. ***Holoporella subdescostilsii*** sp. nov.

(Pl. VI, Fg. 2)

The zoarium, which forms a small irregular mass encrusting shells, consists of more than one layer. Zooecia of upper layers cumulated; frontal wall slightly granular; aperture hat-shaped; the large, subquadrangular anter and small poster, with concaved proximal margin, separated by two acute cardelles; proximal part of peristome raised, forming small chamber that opens above aperture (probably the ovicell in early stage of development). Interzooecial avicularia with pivot, numerous and variable in size; shape elongated rectangular or more or less spathulated.

Dimensions. Aperture { ha=0.18 / wa=0.20 }

Length of the largest avicularium=0.34

Remarks. The present new species resembles *Holoporella descostilsii* (Savigny-Audouin), from which it is distinguished by its smaller size and lack of oral ridge.

Occ. Atebi (very rare).

Genus **Schismopora** MacGillivray, 1888.

52. ***Schismopora tokunagai*** sp. nov.

(Pl. VI, Fig. 3, 4)

The zoarium either encrusts shells or forms a globular or irregular mass consisting of more than one layer. Zooecia not orientated except in lowest layer; frontal wall convex, smooth, strongly calcified and marginated by the areolae; aperture orbicular with sinus; peristome thick, erect, and very long; ovicell recumbent; radially perforated; avicularium lacking.

Dimensions. Aperture { ha=0.17 (large)—0.08 (small) / wa=0.14 („)—0.07 („) }

The size of the aperture varies greatly.

Occ. Dizôdô I (common), Dizôdô II (common), Dizôdô III (rare), Atebi (very rare).

Genus **Osthimosia** Jullien, 1888.

53. ***Osthimosia multiavicularia*** sp. nov.

(Pl. VI, Fig. 1)

The zoarium, which encrusts shells or other bryozoa, sometimes

consists of layers, zooecia small indistinct, a little elongated; frontal wall formed of thick and glossy olocyst and bordered by areolae; aperture semicircular, finely crenulated, with small triangular rimule, opening fairly obliquely to zoarial surface and seated deeply in well developed peristomie and surrounded by many protuberances, of which latter, median protuberance most salient and expanding sometimes at top; ovicell hyperstomial, immersed in distal zooecium and hardly projecting on surface. There are numerous avicularia with elongated triangular beak and pivot on elevation, scattered irregularly. Three pore-chambers on distal half of zooecium.

Dimensions.

$$\text{Aperture}\begin{cases}\text{ha}=0.12\\ \text{wa}=0.12\end{cases}$$

Remarks. Marginal zooecia have frequently no avicularia. Sometimes the zoarium consists of such non-aviculated zooecia, having the appearance of a different species, in which case, the frontal wall is rather ventricose, being bordered by fewer areolae than in the ordinary zooecia. Three protuberances, surrounding the aperture, are especially developed. The avicularium is rarely situated in the peristomie.

This species differs from *Schizoporella cryptostomata* MacGillivray in the shape of the ovicell, in the avicularium and in the presence of the areolae.

Occ. Dizôdô I (common), Dizôdô II (common), Dizôdô III (rare), Atebi (rare).

Genus **Costazia** Neviani, 1895.

54. *"Costazia" geminata* (Ortmann).

Escharoides geminata Ortmann, 1890. "Bry. Jap." p. 43, pl. 3, fig. 17.

Escharoides geminata Okada, 1923. "Str. Corea." p. 227, figs. 17, 18.

The zooecia are not so distinct as in Dr. Okada's figure. For the zooecia to be orientated in the same direction is unusual for the genus.

Distr. Straits of Corea, Toyama Bay (Japan).

Occ. Dizôdô I (very rare), Dizôdô III (common).

Genus **Flabellopora** d'Orbigny, 1852.

55. *Flabellopora transversa* Canu & Bassler.

(Pl. VI, Fig. 10; text-fig. 8)

Flabellopora transversa Canu & Bassler, 1929. "Bry. Philippine." p. 507, pl. 75, fig. 3.

The proximal pore is sometimes joined to the aperture. The latter becomes larger towards the margin, for example

ha=0.10, wa=0.12 } near the ancestrula, and

ha=wa=0.13—0.15 near the center.

The avicularia near the growth margin are subrectangular. The plane of the aperture and of the avicularium are oblique to that of the zoarium

Fig. 8. Schematic section, showing the positions of the aperture(ap), proximal pore(pp) and avicularium(av).

(text-fig. 8). Living specimens not so flabellate as the fossils.

Distr. Cape Tsiuka, Sea of Japan (Canu & Bassler), The Kii Peninsula.

Geological range. Upper Pliocene-Recent.

Occ. Dizôdô III (common), Atebi (rare).

56. *Flabellopora* sp. α.

(Pl. VI, Fig, 9)

Two fragments only; the zoarial form unknown; the apertural form varies greatly. Owing to the remarkable tuberosity, the proximal pore sometimes looks exactly like the orifice of the ovicell. Avicularia with pivot are numerous, orbicular, and scattered between the tubercles.

These characters closely resemble those of a new species collected off Kii Peninsula, but the latter is a little smaller and its avicularia have no pivot. *F.* sp. differs from *F. arculifera* C. & B. in wanting the distal avicularium, and in its strong calcification, and from *F. tubifera* C. & B. in its orbicular avicularia and its distinct proximal pore. It is probably a new species.

Dimensions. Aperture. ha=wa=0.10—0.11

Occ. Dizôdô II (very rare).

Genus **Conescharellina** d'Orbigny, 1852.

57. *Conescharellina crescens* [1] sp. nov.

(Text-fig. 9)

Zoarium moderate, bowl-form, wider than height; apex very obtuse; zooecia arranged closely in radial costules which are very salient and broader than intercostular area; number of costules variable (23-35); aperture orbicular with small rounded distal sinus, deeply located in peristomie, which is well projected, especially at distal margin; peristomice large, subelliptical, opens somewhat diagonally and extends towards lower left corner where proximal pore is situated. It exhibits crescent appearence; avicularia with pivot, situated at bottom of intercostular furrows, small, oval, and subalternated; similar avicularia present also on costules, especially of adult zoarium, above right shoulder of peristome; poriform avicularia not rarely occur on costules; base concave, bordered by zooecia and provided with small elliptical avicularia with pivot scattered.

Dimensions. Zoarium {Height =0.84–1.41 / Diameter=1.67–2.34}

Aperture {ha=0.12 / wa=0.10} Peristome {hp=0.25 / wp=0.12}

Remarks. The function of the so-called "proximal pore" of *Conescharellina* is unknown. In the case of the present species, the proximal pore may perhaps be represented by the pore on the lower left corner of the aperture.

Occ. Dizôdô I (rare), Dizôdô II (very rare), Dizôdô III (rare), Atebi (very rare).

58. *Conescharellina kadusensis* sp. nov.

(Text-fig. 10)

Zoarium conical; apex sharp; zooecia arranged in radial furrows about 18 in number; radial costules nearly twice as wide as intercostular furrow, a little salient. Both margins elevated in broad ridges, leaving a shallow furrow between them, where there are elliptical avicularia with pivot; aperture suborbicular, somewhat elongated, with small distal triangular sinus, situated deeply in the long peristomie, which is elliptical to subrectangular; proximal pore adjacent to aperture; base bordered by large zooecia and its central area occupied by small

1) The specimens from the Yabu Beds have been used in the description. These Beds will be describe in a follwing paper.

Fig. 9
Conescharellina crescens sp. nov.

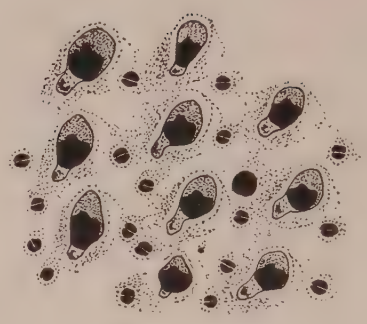


Fig. 10
Conescharellina kadusensis sp. nov.

pores and avicularia with pivot.

Dimensions. Zoarium{Height=1.67 / Diameter=1.69

Aperture{ha=0.13–0.15 / wa=0.10 Peristome{hp=0.17–0.22 / wp=0.12

Occ. Dizôdô I (very rare), Dizôdô III (common), Atebi (very common).

Genus **Myriozoum** Donati, 1750.

59. ***Myriozoum subgracile*** d'Orbigny.

Myriozoum subgracile d'Orb., 1852. "Pal. Fr." p. 662.
Myriozoum subgracile, Smitt, 1867. "Krit. Fört." pp. 18 & 119.
Myriozoum subgracile, Hincks, 1877. "Iceland & Labrador." A.M.N.H. [4] 19, p. 106.
Myriozoum subgracile, Waters, 1900. "Franz-Josef Land." J.L.S. Zool. 28, p. 69, pl. 9, figs. 4–8. (Bibliography)
Myriozoum subgracile, Robertson, 1908. "Incrust. Bry." p. 296, fig. 66.
Myriozoum coarctum O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vancouver Isl." p. 76, pl. 5, fig. 49.
Not. *Myriozoum subgracile*, Do., 1926. p. 76, pl. 5, fig. 50.
(=*Myriozoum coarctum*)

My specimens are fragments, rarely with avicularium, which is situated on the proximal corner of the aperture. The calcification is rather strong and the aperture deeply immersed. O'Donoghue and Elsie O'Don. erroneously identified *Myriozoum coarctum* as *M. subgracile* and *vice versa*. It seems that Robertson's specimens should be revised.

Distr. North Sea, Vancouver Is, California.

Occ. Dizôdô I (rare).

Order CYCLOSTOMATA Busk.
Division Inovicellata Canu & Bassler.

Genus **Stomatopora** Bronn, 1825.

60. *Stomatopora granulata* (Milne-Edwards).

(Pl. VI, Fig. 5)

Alecto granulata Milne-Edwards, 1836. "Mém. Crisies, etc." p. 13.
Stomatopora granulata, Jelly, 1889. "Synon. Cat." p. 256. (Bibliography)
Stomatopora granulata, Pergens, 1889. "Rev. Bry. d'Orb." p. 329, pl. 11, fig. 2.
Stomatopora granulata, O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vanc. Isl." p. 17.

Dimensions. Diameter of tube=0.26, diameter of peristome=0.13 (inner diameter=0.11), length of tube=0.66–0.75.

The peristome enlarges a little anteriorly. The dimensions agree well with those given by Pergens.

Distr. Cosmopolitan.

Occ. Dizôdô I (rare), Dizôdô II (very rare), Dizôdô III (very rare).

Genus **Proboscidea** Audouin, 1826.

61. *Proboscidea coapta* Canu & Bassler.

Proboscidea coapta Canu & Bassler, 1929. "Bry. Philippine." p. 518, pl. 76, fig. 10.

Dimensions. Width of branches=0.83; diameter of peristomes=0.08–0.10; distance of tubes=0.33.

The tubes are frequently wrinkled; fine punctures not rare.

Distr. Jolo (20 fms.)

Occ. Dizôdô I (rare), Dizôdô II (common), Atebi (very rare).

62. *Proboscidea* sp.

(Pl.VI, Fig. 6)

The zoarium is developed from a round ancestrula which soon divides into belt-like lobes oppositely diverged. The lobes consist of about 6 rows of slender tubes.

Dimensions. Diameter of the tube=0.08

Width of the lobe=0.75

Occ. Dizôdô I (rare).

Genus **Filisparsa** D'ORBIGNY, 1853.

63. ***Filisparsa ortmanni*** sp. nov.

(Pl. VII, Fig. 1)

Zoarium free, consists of compressed, bifurcated branches; zooecia distinct, punctured, arranged in 3–5 rows, alternate, rarely fasciculated; peristome slender, salient; dorsal side also punctured, ornamented with slight concentric wrinkles.

Dimensions. Diameter of apertures=0.12
Diameter of peristomes=0.15
Width of zoarium=0.54

Affinity. This species differs from *Idmonea atlantica* in lacking the median elevated zone, and from *Idmonea radicata* KIRKP. and *Filisparsa elegans* CANU & BASSLER in its smaller size.

Occ. Dizôdô I (common), Dizôdô II (very rare), Dizôdô III (rare).

Genus **Tubigerina** CANU, 1911.

64. ***Tubigerina rugosa*** CANU & BASSLER.

Tubigerina rugosa CANU & BASSLER, 1929. "Bry. Philippine." p. 520, pl. 77, figs. 1–3.

Dimensions. Diameter of peristomes=0.20–0.23
Distance of fascicles=0.67–0.85

Distr. Jolo (29 fms.), Sulu archipelago (21 fms.).

Occ. Dizôdô II (very rare), Atebi (rare).

Division Acamptostega BORG.

Genus **Filifascigera** D'ORB., 1852.

65. ***Filifascigera grandiosa*** sp. nov.

(Pl. VI, Fig. 8)

Zoarium encrusts shells; fascicles composed of 4–9 polygonal tubes (sometimes only 2 or 3), circular or elliptical; zooecial tubes punctured, indistinct on zoarial surface.

Dimensions. Diameter of fascicles=0.5–1.0
Diameter of orifices=0.2

The large dimensions characterize this new species.

Occ. Dizôdô I (rare), Atebi (very rare).

Genus **Reptotubigera** d'Orb., 1853.

66. *Reptotubigera philippsae* Harmer.

(Pl. VI. Fig. 7; Pl. VII, Figs. 6, 7)

Reptotubigera philippsae Harmer, 1915. "Siboga Exped." p. 120, pl. 10, fig. 9.

Platonea philippsae Canu & Bassler, 1929. "Bry. Philippine." p. 548, pl. 85, figs. 4, 5.

Diameter of peristome = 0.10–0.12

Lobes bifurcated not infrequently with an angle of about 180°; partially angular along the middle line; tubes always punctured; ooecio-pore oval, situated immediately on inner or on inner and distal side of fascicle.

Distr. Lifu, Loyalty Islands, 73 meters; Siboga Station 310, 8° 30′S., 119° 7′5E., 73 meters (Harmer). Jolo Light, Jolo, 20 fathoms and 29 fathoms (Canu & Bassler).

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (rare), Atebi (rare).

Genus **Idmonea** Lamouroux, 1821.

67. *Idmonea milneana* d'Orbigny.

Idmonea milneana d'Orb., 1839. "Voy. Am. mér." p. 20, pl. 9, figs. 17-21.

Idmonea milneana, Ortmann, 1890. "Jap. Bry." p. 59, pl. 4, fig. 21.

Idmonea milneana, Canu & Bassler, 1920. "Early Tert." p. 773, pl. 136, figs. 1–12. (Bibliography)

Diaperoecia milneana Canu & Bassler, 1923. "Later Tert. & Quat." p. 202, pl. 6, figs. 20, 21.

Some fragments were obtained at Atebi.

Distr. Cosmopolitan.

Genus **Entalophora** Lamouroux, 1821.

68, *Entalophora delicatula* (Busk).

Pustulopora delicatula Busk, 1875. "B.M.Cat" III, p. 20 pl. 6B, fig. 3.

?*Entalophora delicatula* Ortmann, 1890. "Jap. Bry." p. 61, pl. 4, fig. 28a.

Entalophora delicatula, Harmer, 1915. "Siboga Exped." p. 110, pl. 10, fig. 11. (Bibliography)

Entalophora wasinensis Waters, 1914. "British East Africa." p. 840, pl. 2, figs. 1–4, 9; text–fig.

Dimensions. Diameter of peristomes=0.12
Diameter of branches=0.56–0.60
Length of tubes=1.12(1.0–1.32)

The tubes are finely punctured, 4 or 5 of which may be seen from one side.

Distr. Australia, Zanzibar, Florida, East Indies.

Occ. Dizôdô I (rare), Dizôdô II (rare), Dizôdô III (very rare), Atebi (very rare).

69. ***Entalophora nipponica*** sp. nov.

This new species closely resembles *Entalophora delicatula* (Busk) in many respects, especially in the nature of the ovicell. It is distinguished from the latter in its shorter and broader zooecial tubes and the larger diameter of its branches. The ovicell (Pl. 7, Fig. 3) is like that figured by Waters in *Entalophora wasinensis* (1914, Pl. 2, Fig. 1) (=*E. delicatula* Busk). The tubes are finely punctured; the peristomes a little prominent.

Dimensions. Diameter of peristomes=0.14
Diameter of branches=0.66–0.83
Width of tubes=0.17
Length of tubes=0.43–0.66

This species is akin to *Spiropora annulosa* Michelin figured by Canu (1898, B.G.S.F. [3] p. 282, fig. 19), from which it differs in its smaller size.

Occ. Dizôdô I (rare), Dizôdô III (common), Atebi (very rare).

Genus **Tubulipora** Lamarck, 1816.

70. ***Tubulipora pacifica*** Robertson.

Tubulipora pacifica Robertson, 1910. "Cyclo." p. 248, pl. 22, figs. 27, 28.
Tubulipora pacifica, Okada, 1917. "Rep. Cyclo." p. 347.
Tubulipora pacifica, Do., 1928. "Mutsu Bay. Cyclo." p. 488, pl. 24, fig. 4; text-figs. 5a–b.
Tubulipora pacifica, O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vancouver Isl." p. 25.

The zoarial form of my specimens resembles that from Mutu Bay, figured by Dr. Okada. It is neither flabellated nor circular.

Distr. California, Vancouver Isl.; Misaki and Mutu Bay (Japan).

Occ. Dizôdô I (rare).

71. ***Tubulipora pulchra*** MacGillivray.
(Pl. VII, Fig. 4)

Tabulipora pulchra MacGillivray, 1885. "A new or little known Pol." p.

92, pl. 12–14.

Tabulipora pulchra, Robertson, 1910. "Cyclo." p. 250, pl. 23, figs. 32–35.

Tabulipora pulchra, Okada, 1928. "Mutsu Bay. Cyclo." p. 489, pl. 24, fig. 3; text-figs. 6a–3. (Bibliography)

Tabulipora pulchra, O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vancouver Isl." p. 25.

In the form and thickness of the zoarium, my specimens vary considerably. The zooecia, surrounded by the ovicell, are sometimes short and covered by a punctured layer like the latter.

Distr. California, Voncouver Isl., Australia; Mutu Bay (Japan).

Occ. Dizôdô I (common), Dizôdô II (very rare).

72. *Tubulipora flabellaris* (Fabricius).

(Pl. VII, Fig. 5)

Tubipora flabellaris Fabricius, 1780. "Faun. Grönl." p. 430.

Tubulipora flabellaris, Jelly, 1889. "Synon. Cat." p. 264.

Tubulipora flabellaris, Robertson, 1910. "Cyclo." p. 247, pl. 21, figs. 25, 26.

Tubulipora flabellaris, Osburn, 1912. "Woods Hole." p. 218, pl. 20, fig. 11.

Tubulipora flabellaris, O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vancouver Isl." p. 24.

According to Dr. Okada, his *Tubulipora misakiensis*, which is closely related to *T. flabellaris*, is distinguished from the latter simply by the character of the ooeciopore. This however is a very fine difference and, for fossils, is much too difficult.

Although I cannot yet decide to which of these two species my Pleistocene specimens belong, I shall for the present assign them to the older and common species, *T. flabellaris*.

In some specimens, the aperture is not circular but rather angular and somewhat lozenge-shaped.

Distr. Northern species (Europe, after Harmer). Woods Hole, California, Vancouver Is. *T. misakiensis* is common throughout the coast of Japan.

Occ. Dizôdô I (common), Dizôdô II (rare), Dizôdô III (rare).

Genus **Berenicea** Lamouroux, 1821.

73. *Berenicea sarniensis* (Norman).

(Pl. VII, Fig. 8)

Diastopora sarniensis Norman, 1864. "Undescr. Br. Pol. etc." p. 89, pl.

11. figs. 4–6.

Berenicea sarniensis Harmer, 1915. "Siboga Exped. Cyclo." p. 114, pl. 11. figs. 4, 5.

Plagioecia sarniensis Canu & Bassler, 1928. "Gulf of Mexico." p. 159, pl. 34, fig. 10.

My specimens correspond well to Canu & Bassler's figure. The zooecia are almost always obliterated by the strongly calcified and transversely wrinkled layer.

Distr. Atlantic, Mediterranean, Queen Charlotte Is., China Sea, Australian shores.

Occ. Dizôdô I (common), Dizôdô II (rare), Atebi (very rare).

74. *Berenicea* cfr. *patina* (Lamarck).

(Pl. VII, Fig. 10)

Tubulipora patina Lamarck, 1816. Hist. nat. des animaux sans vertèbres. [2]. p. 163.

Berenicea patina, Borg, 1926. "Stud. Rec. Cyclo." pp. 291 & 372. figs. 46, 72.

Berenicea patina, Do., 1930. Die Tierwelt Deutschlands. p. 48, figs. 26, 27.

Dimensions.

Diameter of tube = 0.12
Diameter of ooeciopore = 0.08
Diameter of zoarium = 5.5–6.6

One ovicelled zoarium was obtained from Dizôdô I.

Dist. Arctic, North Sea, Mediterranean, E. Atlantic, Queen Charlotte Is., Vancouver Is., Australia, Japan.

Division Calyptrostega, Borg.

Genus **Lichenopora** Defrance, 1823.

75. *Lichenopora radiata* (Sav.-Audouin).

Melobesia radiata Audouin, 1826. "Expl." p. 235.

Lichenopora radiata, Jelly, 1889. "Synon. Cat." p. 137. (Bibliography)

Lichenopora radiata, Okada, 1917. "Rep. Cyclo." p. 335.

Lichenopora radiata, Do., 1928. "Mutsu Bay. Cyclo." p. 494, text-fig. 11. (Bibliography)

Lichenopora radiata, Canu & Bassler, 1923. "Later Tert. & Quat." p. 204, pl. 44, fig. 10. (Bibliography)

Lichenopora radiata, Do., 1929. "Bry. Philippine." p. 556, pl. 88, figs. 1–6.

Lichenopora radiata, Do., 1930. "Galapagos Isl." p. 56.

Lichenopora radiata, O'Donoghue & Elsie O'Don., 1926. "Sec. List, Vancouver Isl." p. 28.

Distr. Cosmopolitan.

Occ. Dizôdô I (common), Dizôdô II (very rare), Dizôdô III (very rare).

76. *Lichenopora mediterranea* Blainville.

Lichenopora mediterranea Blainville, 1834. "Manuel d'Actinologie." p. 407.

Lichenopora mediterranea, Harmer, 1915. "Siboga Exped." p. 164, pl. 12, figs. 2, 3.

Lichenopora mediterranea, Canu & Bassler, 1929. "Bry. Philippine." p. 561, pl. 90, figs. 1–3.

Distr. Mediterranean, Malaya, 6°08′N; 121° 19′E; Misaki (Japan).

Occ. Dizôdô II (very rare), Dizôdô III (very rare).

77. *Lichenopora buski* Harmer.

Discoporella ciliata Busk, 1875. "Cat. M.P. Cyclo." p. 31, pl. 30, fig. 6; pl. 33, fig. 4.

Lichenopora buski Harmer, 1915. "Siboga Exped." p. 161, pl. 12, fig. 4, 5.

Lichenopora buski, Canu & Bassler, 1929. "Bry. Philippine." p. 558, pl. 88, figs. 7–10.

Distr. Cape Tsiuka, Sea of Japan; Misaki, Pacific coast of Japan. Sulu Archipelago, Torres Straits, Malaya, Cape of Good Hope, New-Zealand, New South Wales.

Occ. Dizôdô I (rare), Dizôdô II (rare).

References.

Papers which have remained inaccessible to me are indicated by affixing asterisks.

*Audouin, V. 1826. Explication sommaire des Planches de Polypes de l'Egypte et de la Syrie.

Borg, F. 1926. Studies on Recent Cyclostomatous Bryozoa. Zool. Bidr. Upsala, vol. x. pp. 181–507.

Busk, G. 1852. Catalogue of the Marine Polyzoa. pt. i. (Cheilostomata).

———, 1854. Catalogue of the Marine Polyzoa. pt. ii. ( ).

———, 1875. Catalogue of the Marine Polyzoa. pt, iii. (Cyclostomata).

———, 1859. Monograph of the Fossil Polyzoa of the Crag. Paleontol. Soc.

———, 1859. On some Madeiran Polyzoa. Quat. J. Micr. Sci. vol. vii.

———, 1884. Polyzoa, pt. i. The Cheilostomata, Zool. Chall. Exp. vol. xxx.

Canu, F. 1898. Etude sur les ovicelles des Bryozoaires du Bathonien d'Occaignes. B. S. G. F. 3 Tom. 26.

Canu & Bassler, 1917. A synopsis of American Early Tertiary Cheilostome Bryozoa. U. S. Nat. Mus. Bull. 96.

——— & ———, 1919. Fossil Bryozoa from the West Indies. Publ. 291, Carnegie Institution of Washington.

——— & ———, 1920. North American Early Tertiary Bryozoa. U. S. Nat. Mus. Bull. 106, 2 vols.

——— & ———, 1923. North American Later Tertiary & Quaternary Bryozoa. U. S. Nat. Mus. Bull. 125.

——— & ———, 1925. Les Bryozoaires du Maroc et de Mauritanie. Mém. de la Société des Sci. Nat. du Maroc No. 10.

——— & ———, 1927. Classification Cheilostomatous Bryozoa. No. 2640, Proc. U. S. Nat. Mus.

——— & ———, 1928. Bryozoaires du Brésil. Bull. Soc. Seine et Oise, vol. ix.

——— & ———, 1927 & 28. Bryozoaires des Ils. Hawai. Ibid. fasc. 7, suppl.

——— & ———, 1928. Fossil and Recent Bryozoa of the Gulf of the Mexico Region. No. 2710, Proc. U. S. Nat. Mus.

——— & ———, 1929. Bryozoa of the Philippine Region. U. S. Nat. Mus. Bull. 100, vol. 9.

——— & ———, 1930. The Bryozoa of the Galapagos Islands. No 2810, Proc. U. S. Nat. Mus.

*Esper, E. J. C. 1794–1797. Fortzetzungen der Pflanzenthiere, vol. 2.

*Gray, J. E. 1848. List of the Specimens of British Animals in the Collection of the Brit. Museum. pt. 1.

Harmer, S. F. 1915. The Polyzoa of the "Siboga Expedition". Pt. 1. Entoprocta, Ctenostomata and Cyclostomata.

———, 1926. The Polyzoa of the "Siboga Expedition". Pt. II. Cheilostomata Anasca.

Hastings, A. B. 1930. Cheilostomatous Polyzoa from the Vicinity of the Panama Canal. Proc. Zool. Soc. London, 1929.

Hincks, T. 1880. History of the British Marine Polyzoa. 2 vols.

———, 1883. Polyzoa of the Queen Charlotte Islands. A. M. N. H. [5] vol. 11. pp. 442–451.

———, 1884 Op. cit. Ibid. vol. 13. pp. 49–58 and 203–215.

Jelly, E. C. 1888. A Synonymic Catalogue of the Recent Marine Bryozoa.

Jullien, J. 1888. Mission scientifique du Cap Horn. Tom. 6. Zoologie.

Kirkpatrick, R. 1890. Hydrozoa and Polyzoa from the China Sea. A. M. N. H. [6] 5.

Levinsen, G. M. R. 1909. Morphological and Systematic Studies on the Cheilostomatous Bryozoa.

MacGillivray. 1870–1890. Bryozoa in McCoy's Prodromus of the Zoology of Victoria. 3 vols.

Norman, 1909. The Polyzoa of Madeira and neighbouring Islands. J. Linn. Soc. Zool. vol. 30.

O'Donoghue, Ch. H & O'Don., Elsie. 1924. A preliminary List of Polyzoa (Bryozoa), from the Vancouver Island Region. Contr. Canad. Biol. (N. S.) vol. 1.

O'Donoghue, Ch. H & O'Donoghue, Elsie. 1926. A Second List of the Bryozoa from the Vancouver Isl. Region. Ibid (N. S.) vol. 3.

Okada. Y., 1917. A Report on the Cyclostomatous Bryozoa of Japan. Annotationes Zoologicae Japonenses. vol. 9.

——, 1923. On a Collection of Bryozoa from the Straits of Corea. Ibid, vol. 10.

——, 1928. Cyclostomatous Bryozoa of Mutsu Bay. Sci. Rep. Tohoku Imp. Univ. vol. 3, no. 4, fasc. 1.

——, 1929. Cheilostomatous Bryozoa of Mutsu Bay. Ibid. vol. 4, no. 1, fasc. 1.

——, 1934. Bryozoa Fauna in the Vicinity of the Shimoda Marine Biological Station. Sci. Rep. Tokyo Univ. Lit. & Sci. Section B, vol. 2, no 26.

d'Orbigny, A. 1850–1852. Paléontologie française. Terrains crétacés. Tom. 5. Bryozoaires. Texte et Atlas.

Ortmann, A. E. Die Japanische Bryozoen-Fauna. Archiv für Naturgeschichte, Bd. I Heft. I.

Osburn, R. C. 1912. The Bryozoa of the Woods Hole Region. Bull. U. S. Bur. Fish. vol. 30.

Pergens, 1889. Revision des Bryozoaires du Crétacé figurés par d'Orbigny. Bull. Soc. Bélge Géol.

——, 1905. Non-Incrusting Chilostomatous Bryozoa of the West coast of North America. Univ. of California Publication in Zoology. vol. 2.

——, 1908. The Incrusting Chilostomatous Bryozoa. Ibid. vol. 4.

——, 1910. The Cyclostomatous Bryozoa. Ibid. vol 6.

Smitt, F. A. 1872. Floridan Bryozoa. Part. I. K. Sv. Vet. Akad. Handl. Bd. 10.

——, 1873. Floridan Bryozoa. Part. II. Ibid. Bd. 11.

Waters, A. W. 1918. Some collections of the Littoral Marine Fauna of the Cape Verde Isl. J. Linn. Soc. Zoology. vol. 34.

Explanation of Plates.

The numbers in square brackets are those registered in the author's collection.

Plate 1.

Cupuladria elongata sp. nov.

Fig. 1. Inner face, showing elongated compartments, ×20. Dizôdô II.

Fig. 2. Frontal view of same specimen. ×3.

Fig. 3. Zooecia, ×20. Itinosawa.

Pyrulella corbula (Hincks).

Fig. 4. Ovicelled zoarium, ×20. Some zooecia are regenerated. Dizôdô I [29].

Tegella robertsoni O'Donoghue & Elsie O'Don.

Fig. 5. An ovicelled zoarium, ×20. Dizôdô I [233].

'*Tegella*' *kadusensis* sp. nov.

Fig. 6. Ovicelled zoarium, ×20. Dizôdô I [151].

Fig. 7. Small zoarium, ×20. The ancestrula is of 'tata-form'. Dizôdô I [223].

Rhamphonotus okadai sp. nov.

Fig. 8. Incrusting specimen, ×10. An. ovicell is broken. Dizôdô II
Amphiblestrum canui sp. nov.
Fig. 9. Ovicelled zoarium, ×20. The pore-chambers are visible Dizôdô I [52].

Plate II.

Onychocella subsymmetrica Canu & Bassler.
Fig. 1. Portion of zoarium, ×20. Dizôdô I [89].
Rosseliana sibatai sp. nov.
Fig. 2. Portion of zoarium, ×20. One zooecium is regenerated. Dizôdô I [97].
Fig. 3. Ovicelled zoarium, ×20. Dizôdô I [195].
Fig. 4. Ovicelled zoarium, ×20. Off Kii Peninsula, Japan.
Verminaria areolae sp. nov.
Fig. 5. Portion of zoarium, ×20. Dizôdô I [165].
Labioporella elegans sp. nov.
Fig. 6. Portion of zoarium, ×20. Dizôdô III [381].
Thalamoporella dizodoensis sp. nov.
Fig. 7. Portion of zoarium, ×10. Dizôdô I.
Micropora coriacea (Esper).
Fig. 8. Ovicelled zoarium, ×20. Dizôdô I [29].

Plate III.

Monoporella fimbriata Canu & Bassler.
Fig. 1. Ovicelled zoarium, ×20. Several zooecia are carinated. Dizôdô I [4].
Schizopodrella ternata (Ortmann).
Fig. 2. Portion of zoarium, ×20. Dizôdô I [152].
Fig, 3. Ovicelled zoarium, ×20. The ovicells are broken. Dizôdô III.
Schizoporella costulata distincta var. nov.
Fig. 4. Portion of zoarium, ×20. Strongly costulated. Yabu II.
Fig. 5. Portion of zoarium, ×20. Dizôdô I [262].
Petraliella cf. *philippinensis* Canu & Bassler.
Fig. 6. Some zooecia, ×20. Dizôdô I [23].
Caberea lata Busk.
Fig. 7. Fragment, ×20. Dizôdô I.
Schizopodrella spathulata sp. nov.
Fig. 8. A zoarium, ×10. The broken ovicells and avicularia are visiole. Dizôdô I.
Membraniporella subpetasus sp. nov.
Fig. 9. Portion of zoarium. Dizôdô I [191].

Plate IV.

Gemellipora minutipora Canu & Bassler.
Fig. 1. A zoariam, ×20. Dizôdô. I.
Lacerna granulosa sp. nov.
Fig. 2. Ovicelled zoarium, ×20. Dizôdô I [29].
Fig. 5. Portion of zoarium, ×20. Dizôdô I [2].
Stephanosella biaperta (Michelin).
Fig. 3. Portion of zoarium, ×20. Dizôdô I [52].
Hippodiplosia pertusa (Esper).

Fig. 4. Portion of zoarium, ×20. Dizôdô I [210].

Hippoporina porcellana (Busk).

Fig. 6. Portion of zoarium, ×20. The zooecia are indistinct and the avicularia, rare. Dizôdô I [29].

Exochella longirostris quadricella var. nov.

Fig. 7. Portion of zoarium, encrusting a brachiopod, ×20. The avicularia are immersed. Dizôdô II [236].

Plate V.

Lagenipora nipponica sp. nov.

Fig. 1. A zoarium showing everted peristomes, ×20. Dizôdô I [193]

Fig. 9. A zoarium, ×20. Dizôdô I [136].

Smittina adeonelloides (Ortmann).

Fig. 2. Portion of zoarinm, ×20. Atebi.

Smittina porifera (Hincks).

Fig. 3. Ovicelled zoarium, ×20. Dizôdô I [22].

Smittina reticulata ascoporoides var. nov.

Fig. 4. Ovicelled zoarium, ×20. Dizôdô I [97].

Smittina trispinosa nitida (Hincks).

Fig. 5. Portion of zoarium, ×20. The elliptical and elongated avicularia are visible. Dizôdô I [1].

Osthimosia multiavicularia sp. nov.

Fig. 6. Portion of zoarium, ×20. Dizôdô I [282].

Plate VI.

Osthimosia multiavicularia sp. nov.

Fig. 1. Portion of zoarium, ×20. Marginal zooecia do not contain avicularia. Dizôdô I [30].

Holoporella subdescostilsii sp. nov.

Fig. 2. Portion of zoarium, ×20. Atebi.

Schismopora tokunagai sp. nov.

Fig, 3. Portion of zoarium, ×10. Dizôdô I [239].

Fig. 4. The same colony, ×3.

Stomatopora granulata (Milne-Edwards).

Fig. 5. Several zooecia, ×3. Dizôdô I [39].

Proboscidea sp.

Fig. 6, Zoarium, ×3. Dizôdô I [39].

Reptotubigera philippsae Harmer.

Fig. 7. Zoarium, ×3. The two lobes make an angle of about 120° Dizôdô I [122].

Filifascigera grandiosa sp. nov.

Fig. 8. Portion of zoarium, ×10. Dizôdô I [91].

Flabellopora sp. α.

Fig. 9. Portion of zoarium showing the strong calcification, ×20. Atebi.

Flabellopora transversa Canu & Bassler.

Fig. 10. Portion of zoarium, ×20. Atebi.

Plate VII.

Filisparsa ortmanni sp. nov.

Fig. 1. Four fragments showing frontal and dorsal faces, ×10. Dizôdô I.

Entalophora nipponica sp. nov.

Fig. 2. Portion of branch, ×20. Dizôdô I.

Fig. 3. Ovicell, ×20. Dizôdô I.

Tubulipora pulchra MacGillivray.

Fig. 4. Ovicelled zoarium, ×10. Dizôdô I [117].

Tubulipora flabellaris (Fabricius).

Fig. 5. Ovicelled small zoarium, ×10, Dizôdô I [112].

Reptotubigera philippsae Harmer.

Fig. 6. Ovicelled lobe, ×10. Dizôdô I [73a].

Fig. 7. Ovicelled lobe, ×10. Dizôdô I [73b].

Berenicea sarniensis (Norman).

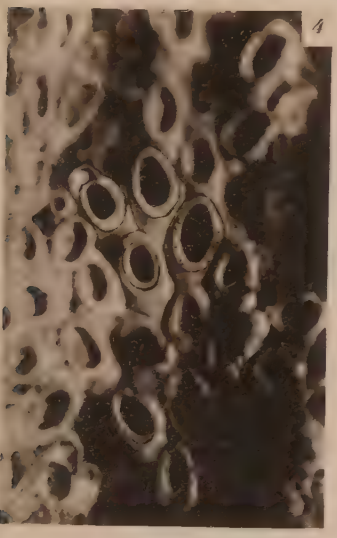
Fig. 8. A complete zoarium, ×10. Ovicelled. Dizôdô I [32].

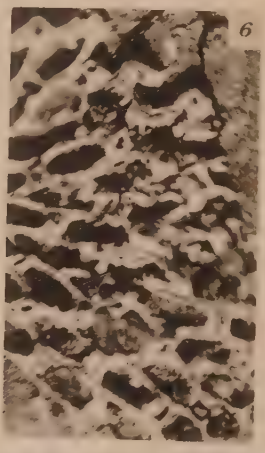
Lichenopora buski Harmer.

Fig. 9. Zoarium, ×10. Dizôdô I [37].

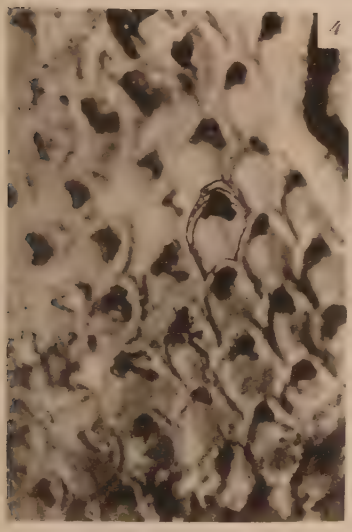
Berenicea cf. *patina* (Lamarck).

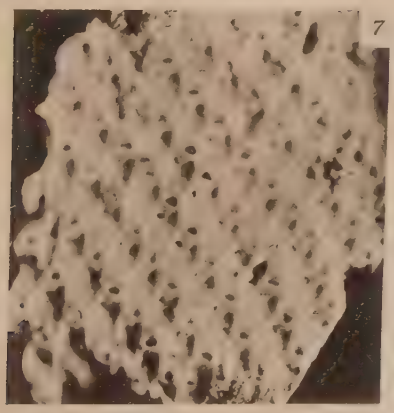
Fig. 10. Ovicelled zoarium, ×10. Dizôdô I [98].



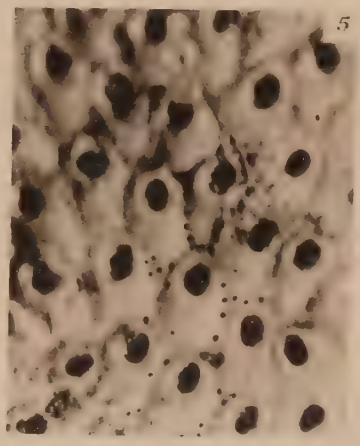


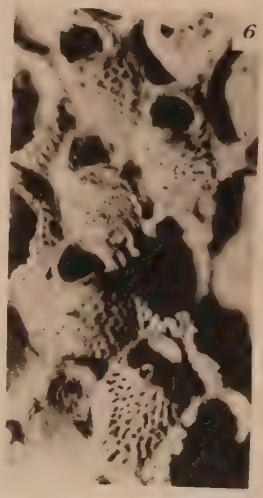
K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).

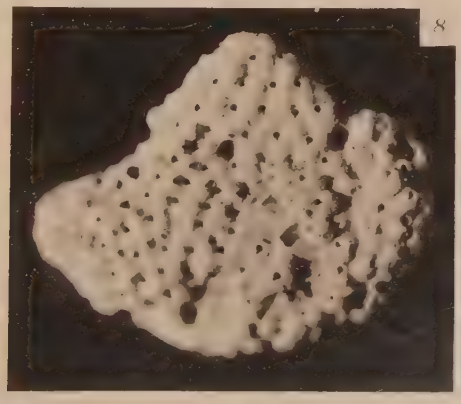




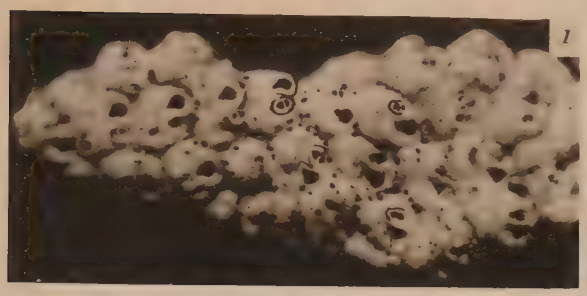
K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).



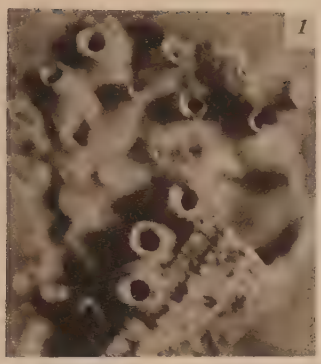


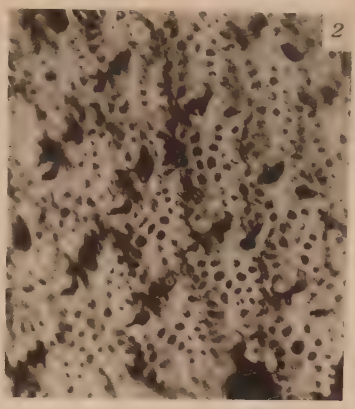


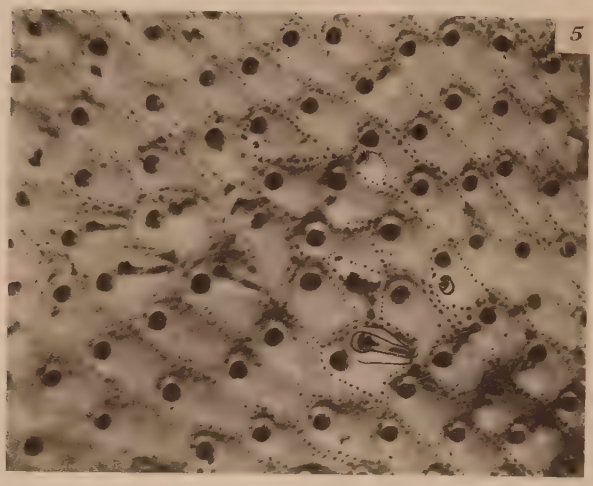
K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).

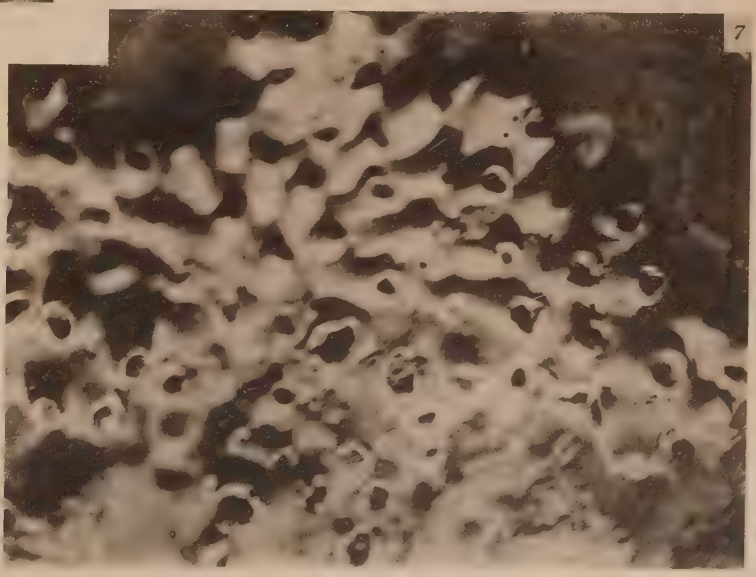


K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).

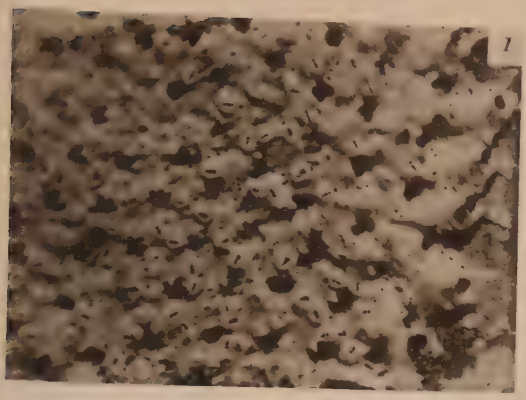


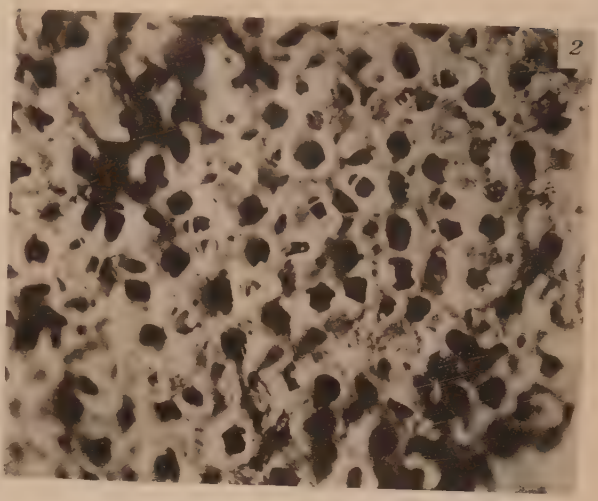


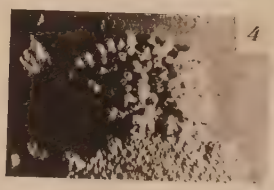


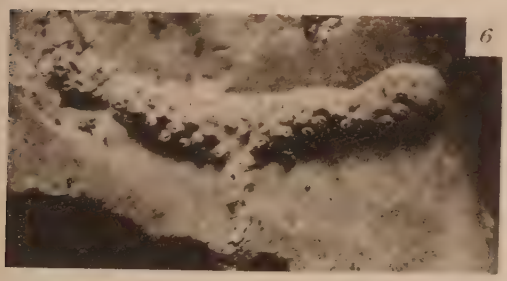


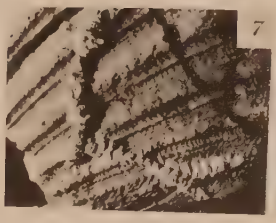
K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).

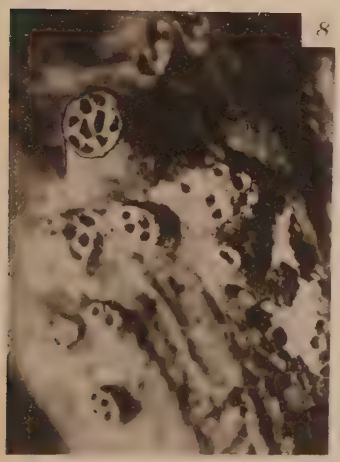


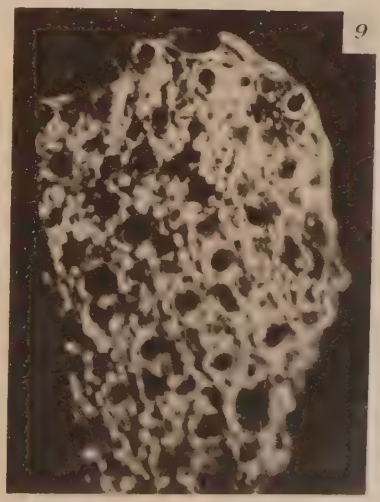










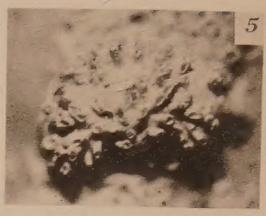


K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).


1


2


4

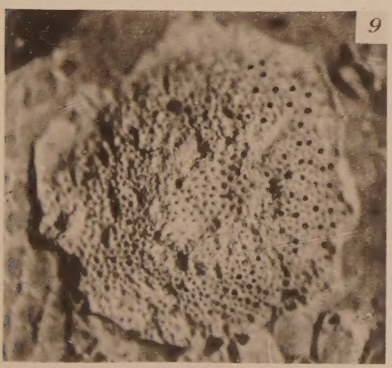

5

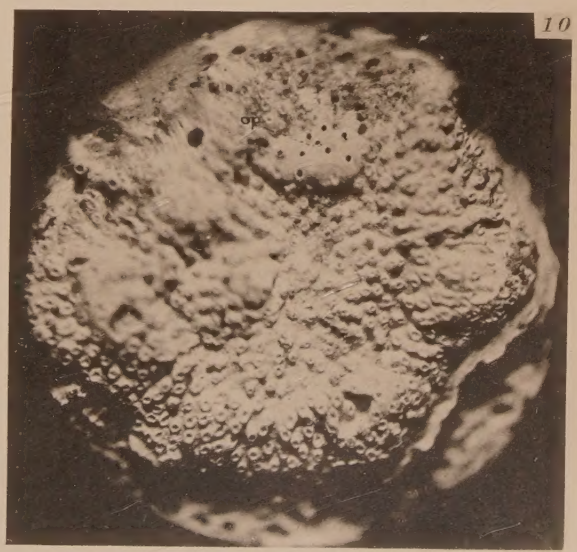

6


7

3


8


9



10

K. Sakakura: Bryozoa from Dizôdô Beds. (Lower Pleistocene).

JOURNAL OF THE FACULTY OF SCIENCE
IMPERIAL UNIVERSITY OF TOKYO

SECTION I. MATHEMATICS, ASTRONOMY, PHYSICS, CHEMISTRY

Vol. I. Completed.

Vol. II, Part 1. Z. Suetuna, Ueber die Anzahl der Idealfaktoren von n in einem algebraischen Zahlkörper. Price ¥ 0.80

" Part 2. K. Shoda, Ueber die Automorphismen einer endlichen zerlegbaren Gruppe. Price ¥ 0.80

" Part 3. K. Shoda, Ueber direkt zerlegbare Gruppen. Price ¥ 0.40

" Part 4. S. Fujiwhara and others, The Lunar Influence on the Atmospheric Pressure in the Far East. Parts I, II and III. Price ¥ 0.90

" Part 5. H. Hasse und Z. Suetuna, Ein allgemeines Teilerproblem der Idealtheorie. Price ¥ 0.40

" Part 6. Z. Suetuna, Ueber die Anzahl der Idealteiler. Price ¥ 0.40

" Part 7. K. Shoda, Ueber die irreduziblen Substitutionsgruppen, deren Grade Primzahl sind. K. Shoda, Bemerkungen über vollständig reduzible Gruppen. Price ¥ 0.50

" Part 8. K. Takeda, K. Terada, T. Hagiwara, K. Atumi, T. Ehiro and T. Tudikawa, Monthly and Annual Deviations of Meteorological Elements in Japan. Part I, II and III. Price ¥ 2.80

" Part 9. Claude Chevalley, Sur la théorie du corps de classes, etc. Price ¥ 1.40

" Part 10. Helmut Hasse, Normenrestheorie galoisscher Zahlkörper, etc. Price ¥ 0.40

Vol. III, Part 1. H. Nakano, Zur Theorie der gewöhnlichen Differentialgleichungen. Price ¥ 1.20

SECTION II. GEOLOGY, MINERALOGY, GEOGRAPHY, SEISMOLOGY

Vol. I, II, III. Completed.

SECTION III. BOTANY

Vol. I, II, III. Completed.

Vol. IV, Part 1. K. Ohki, On the Systematic Importance of Spodograms in the Leaves of the Japanese Bambusaceae. Price ¥ 1.70

" Part 2. Y. Satake, Systematic and Anatomical Studies on Some Japanese Plants, II. (JUNCACEAE). Price ¥ 1.80

" Part 3. S. Watari, Anatomical Studies on Some Leguminous Leaves, with Special Reference to the Vascular System in Petioles and Rachises. Price ¥ 2.90

" Part 4. T. Miduno, Zytologische Untersuchungen der Bryophyten, I. Die Morphologie der Spermatozoiden einiger Hepaticeen. A. Yuasa, Studies in the Cytology of Pteridophyta. V. Price ¥ 0.90

SECTION IV. ZOOLOGY

Vol. I, II. Completed.

Vol. III, Part 1.

" Part 2.

SECTION V. ANTHROPOLOGY

Vol. I, Part 1.

CONTENTS

This JOURNAL is on sale at

MARUZEN Co., LTD.
6, Nihonbashi Tori-Nichome, Tokyo

R. FRIEDLÄNDER & SOHN
Karlstr. 11, Berlin, N.W. 6

Price in Tokyo : Yen 1.20 for this Part

昭和十年六月十日印刷
昭和十年六月十五日發行

編纂兼發行者
東京帝國大學

印刷者 東京市深川區白河町四丁目一番地一
星野錫

印刷所 東京市深川區白河町四丁目一番地一
東京印刷株式會社

寶捌所 東京市日本橋區通二丁目六番地
丸善株式會社